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## **CHALLENGES AND OPPORTUNITIES FOR ACCESSING E-LEARNING IN DIGITALIZED PUBLIC SECONDARY SCHOOLS IN BUEA-CRM SOUTH WEST REGION OF CAMEROON**

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### **Abstract**

This study examines the challenges and opportunities for accessing e-learning in digitalized public secondary schools in Buea-CRM. The research aims to investigate how infrastructural availability, institutional support, and digital competencies influence students' and teachers' engagement with e-learning platforms (van Dijk, 2020; UNESCO, 2021). A descriptive survey design is employed, involving students, teachers, and school administrators across selected digitalized public schools. Data are collected using structured questionnaires and semi-structured interviews and analyzed through descriptive statistics, with findings reported in percentages to illustrate patterns of access, device availability, digital skills, and institutional support (Creswell & Creswell, 2018). The results indicate that while most schools possess computer laboratories and students widely access smartphones, consistent use of e-learning platforms is limited due to unreliable internet connectivity, insufficient devices, minimal technical support, and uneven digital competencies (Traxler, 2018; Redecker, 2017). Opportunities for enhancing e-learning access include mobile device use, availability of digital learning resources, and administrative encouragement. The study concludes that improving e-learning engagement requires integrated strategies addressing infrastructure, capacity-building, and institutional support. These findings have significant implications for policymakers, school administrators, and educators in designing inclusive digital education policies that promote equitable access and improved learning outcomes (Selwyn, 2016; OECD, 2020). Future research should investigate the impact of e-learning access on academic performance and explore comparative strategies in other regional and cultural contexts.

### **Keywords:**

*Challenges And Opportunities, Accessing, E-Learning, Digitalized Public Secondary Schools, Buea, South West Region, Cameroon.*

### **Introduction**

The rapid expansion of digital technologies continues to transform educational systems globally, redefining how teaching and learning are accessed, delivered, and managed. E-learning, broadly understood as the use of digital and internet-based platforms to support learning processes, emerges as a critical component of contemporary secondary education,

particularly within digitalized school environments (Moore, Dickson-Deane, & Galyen, 2011). In many developing contexts, including sub-Saharan Africa, governments increasingly invest in educational digitalization to address issues of access, equity, and quality (UNESCO, 2023). Cameroon aligns with this global agenda through policies promoting ICT integration in public secondary schools, especially in urban and semi-urban regions such as Buea in the Cameroon Republic of the Mungo (CRM).

Despite growing policy commitments and infrastructural investments, access to e-learning in public secondary schools remains uneven and contested. While digitalized schools theoretically provide opportunities for flexible learning, enhanced learner engagement, and expanded educational resources, practical access to e-learning is often constrained by infrastructural, socio-economic, pedagogical, and institutional factors (Tondeur et al., 2017). In Buea-CRM, public secondary schools increasingly adopt digital tools such as computer laboratories, online learning platforms, and virtual communication systems; however, students' and teachers' actual ability to access and meaningfully use e-learning systems varies significantly.

This study addresses a critical gap by examining both the challenges and opportunities associated with accessing e-learning within digitalized public secondary schools in Buea-CRM. Existing research frequently emphasizes technological availability without sufficiently interrogating access conditions, contextual barriers, and enabling factors specific to public secondary education in localized African settings (Karsenti, 2020). By focusing on access rather than mere availability, this study contributes context-sensitive evidence to inform policy, practice, and future research.

### **Research Problem**

Access to e-learning in digitalized public secondary schools remains a persistent challenge despite increasing digital infrastructure and policy support. In Buea-CRM, public secondary schools are formally described as “digitalized” due to the presence of computers, internet connectivity, and ICT policies; however, these features do not automatically translate into equitable or effective access to e-learning for all students and teachers. Research consistently demonstrates that digital divides extend beyond hardware provision to include disparities in connectivity quality, digital skills, institutional support, and socio-economic conditions (van Dijk, 2020).

The core problem addressed in this study is the disconnect between the formal digitalization of public secondary schools and the actual accessibility of e-learning opportunities for learners. Students in the same digitalized school may experience unequal access due to factors such as limited internet bandwidth, inadequate digital literacy, insufficient teacher support, and inconsistent power supply. At the same time, opportunities such as flexible learning schedules, access to global educational resources, and enhanced learner autonomy remain underutilized (Al-Samarrie, Teng, Alzahrani, & Alalwan, 2018). Without empirical evidence on how challenges and opportunities intersect in specific local contexts like Buea-CRM, educational stakeholders risk implementing generalized digital strategies that fail to address ground-level realities. This study therefore responds to the need for a systematic investigation of access-related constraints and enabling conditions within digitalized public secondary schools.

## Understanding the Context

Buea-CRM is an educational hub in Cameroon, hosting a concentration of public secondary schools and benefiting from relative urban infrastructure compared to many rural regions. The Cameroonian government promotes ICT integration through national strategies aimed at modernizing education and preparing learners for a knowledge-based economy (Ministry of Secondary Education [MINESEC], 2022). These initiatives encourage schools to adopt e-learning platforms, computer-assisted instruction, and digital communication tools. However, Cameroon's broader socio-economic context presents structural challenges to effective e-learning access. National statistics reveal persistent gaps in household internet access, electricity reliability, and digital literacy, particularly among students from low-income backgrounds (International Telecommunication Union [ITU], 2023). In public secondary schools, these challenges are compounded by large class sizes, limited technical support, and teachers' varying levels of digital competence (Ngoube & Ndzi, 2021).

At the same time, Buea-CRM offers unique opportunities for e-learning expansion due to its growing telecommunications infrastructure, proximity to higher education institutions, and increasing exposure to digital innovation. These contextual dynamics make Buea-CRM a relevant setting for examining how challenges and opportunities shape access to e-learning in digitalized public secondary schools. Existing literature conceptualizes e-learning access as a multidimensional construct encompassing physical access to devices, connectivity, digital skills, institutional support, and pedagogical integration (Selwyn, 2016). Studies conducted in African secondary schools highlight infrastructural limitations, including unreliable internet and insufficient devices, as major barriers to e-learning access (Boateng, 2022). Socio-economic inequalities further influence students' ability to engage in online learning beyond the school environment (Trucano, 2015).

Conversely, research also documents significant opportunities associated with e-learning adoption in secondary education. E-learning enhances learner autonomy, supports differentiated instruction, and expands access to educational content beyond traditional classroom boundaries (Means et al., 2014). In digitalized schools, e-learning platforms facilitate collaborative learning, continuous assessment, and improved teacher-student interaction (Garrison, Anderson, & Archer, 2010). However, many studies adopt national or regional perspectives, offering limited insight into localized school-level experiences in Cameroon. Moreover, research often focuses on higher education, leaving public secondary schools underrepresented in empirical scholarship (Karsenti & Lira-Gonzales, 2021). This study responds to these gaps by foregrounding access-related challenges and opportunities within a specific public secondary school context.

## Hypothesis or Guiding Questions

This study is guided by the assumption that access to e-learning in digitalized public secondary schools is shaped by both constraining and enabling factors operating simultaneously. Based on this premise, the study is guided by the following research questions: What challenges affect students' and teachers' access to e-learning in digitalized public secondary schools in Buea-CRM? What opportunities do digitalized school environments provide for enhancing access to e-learning? How do infrastructural, institutional, and socio-economic factors influence e-learning access in public secondary schools? What strategies can strengthen equitable and effective access to e-learning in digitalized public secondary schools? By addressing these

questions, the study contributes empirically grounded insights to support inclusive digital education policies and practices within Cameroon's public secondary school system.

## Literature Review

This literature review presents a critical synthesis and evaluation of existing scholarship related to the challenges and opportunities associated with accessing e-learning in digitalized public secondary schools. The review integrates global, regional, and African-based studies to establish conceptual clarity, examine dominant theoretical perspectives, and identify empirical gaps that justify the current study. Emphasis is placed on access as a multidimensional construct influenced by technological, socio-economic, institutional, and pedagogical factors.

## Prior Studies

Extant research consistently recognizes e-learning as a transformative approach capable of enhancing educational access, flexibility, and quality across diverse educational systems (Moore et al., 2011). In secondary education, e-learning supports blended instructional models, extends learning beyond classroom boundaries, and enables personalized learning experiences (Means et al., 2014). However, empirical studies increasingly emphasize that the benefits of e-learning are contingent upon equitable access rather than mere technological availability. Globally, studies conducted in high-income countries highlight infrastructure readiness, digital literacy, and institutional leadership as primary determinants of e-learning access (Selwyn, 2016).

Research in Europe and North America demonstrates that schools with robust internet connectivity, continuous teacher training, and clear digital policies achieve higher levels of student engagement in e-learning environments (Vanderlinde & van Braak, 2010). These contexts also show that access disparities persist among students from marginalized socio-economic backgrounds, suggesting that digitalization alone does not eliminate inequality (van Dijk, 2020).

In developing regions, particularly sub-Saharan Africa, research foregrounds structural barriers to accessing e-learning. Studies conducted in Kenya, Nigeria, and Ghana identify unreliable electricity supply, limited internet bandwidth, and insufficient digital devices as major impediments in public secondary schools (Boateng, 2022; Tella & Mutula, 2008). These challenges disproportionately affect public schools compared to private institutions, thereby reinforcing educational inequities (Trucano, 2015).

Cameroon-specific studies reflect similar trends. Research on ICT integration in Cameroonian secondary schools indicates that while many public schools possess basic ICT infrastructure, actual access to e-learning platforms remains constrained by inadequate maintenance, limited technical support, and low teacher confidence in using digital tools (Ngoube & Ndzi, 2021). Furthermore, students' access outside school settings is often restricted due to household poverty, limited data affordability, and uneven digital skills development (ITU, 2023). Despite these challenges, prior studies also highlight emerging opportunities. E-learning facilitates continuity of learning during disruptions, promotes collaborative learning, and expands access to global educational resources (Garrison et al., 2010). In African contexts, mobile learning initiatives and low-bandwidth platforms increasingly provide alternative pathways for

accessing digital content (Karsenti, 2020). These opportunities suggest that contextualized strategies can mitigate access challenges when aligned with local realities.

Nevertheless, much of the existing literature adopts broad national or regional perspectives, with limited focus on localized school-level experiences in specific settings such as Buea-CRM. Moreover, many studies prioritize higher education, leaving public secondary schools underexplored. This limitation underscores the need for context-specific research that simultaneously examines challenges and opportunities affecting access to e-learning.

### **Theoretical Foundation**

This study is grounded in multiple complementary theories that explain access to e-learning in digitalized educational environments. Chief among these are Digital Divide Theory, the Technology Acceptance Model (TAM), and Constructivist Learning Theory. Digital Divide Theory conceptualizes access to digital technologies as a layered phenomenon encompassing physical access, skills access, and usage access (van Dijk, 2020). The theory emphasizes that inequalities persist even after technology is introduced, due to disparities in socio-economic status, education, and institutional support. In the context of digitalized public secondary schools, this framework explains why some students and teachers benefit from e-learning while others remain excluded despite the presence of ICT infrastructure.

The Technology Acceptance Model provides insight into how users' perceptions influence their willingness to adopt e-learning systems (Davis, 1989). TAM posits that perceived usefulness and perceived ease of use shape attitudes toward technology adoption. Studies applying TAM in educational settings demonstrate that teachers' and students' access to e-learning is mediated by confidence, prior experience, and institutional encouragement (Al-Samarrie et al., 2018). In public secondary schools, limited training and support often reduce perceived usefulness, thereby constraining access. Constructivist Learning Theory further informs this study by emphasizing learner-centered, interactive, and collaborative knowledge construction (Vygotsky, 1978).

E-learning environments align closely with constructivist principles by enabling active engagement, peer interaction, and self-paced learning. However, effective access requires supportive pedagogical practices and digital competence among both teachers and learners (Garrison et al., 2010). Together, these theoretical perspectives provide a comprehensive lens for examining how technological, cognitive, and socio-structural factors interact to shape access to e-learning in digitalized public secondary schools.

### **Identified Gaps**

Despite a growing body of literature on e-learning, several critical gaps persist. First, many studies conflate the availability of digital infrastructure with access, failing to account for qualitative dimensions such as usability, affordability, and institutional support (Selwyn, 2016). This narrow focus limits understanding of how access is experienced by students and teachers in everyday school contexts. Second, research in sub-Saharan Africa often prioritizes tertiary education, leaving public secondary schools underrepresented in empirical investigations (Karsenti & Lira-Gonzales, 2021). This imbalance is problematic, given that secondary education plays a pivotal role in shaping foundational digital skills and educational trajectories.

Third, existing studies frequently emphasize challenges while underexploring opportunities. While barriers such as poor connectivity and limited resources are well documented, fewer studies systematically examine how digitalized school environments create new possibilities for learning access, innovation, and resilience (Means et al., 2014). Fourth, Cameroon-specific research remains limited in scope and depth, particularly at the localized level. Few studies focus explicitly on Buea-CRM, despite its unique socio-educational context characterized by urbanization, linguistic diversity, and increasing digital exposure. This gap restricts the development of contextually relevant policies and interventions.

Finally, there is limited integration of theoretical frameworks in empirical studies, resulting in descriptive findings that lack explanatory power. This gap underscores the need for theory-informed research that links observed challenges and opportunities to broader conceptual models.

### **Justification for the Current Study**

The current study is justified by the need to address the identified gaps through a localized, theory-driven examination of challenges and opportunities for accessing e-learning in digitalized public secondary schools in Buea-CRM. By focusing on access rather than infrastructure alone, the study provides a nuanced understanding of how digitalization translates into actual learning opportunities for students and teachers. This study contributes to knowledge by integrating Digital Divide Theory, Technology Acceptance Model, and Constructivist Learning Theory to explain access dynamics within a public secondary school context. It also extends existing literature by foregrounding opportunities alongside challenges, thereby offering a balanced and practical perspective.

From a policy and practice standpoint, the study generates context-specific evidence to inform educational planning, resource allocation, and capacity-building initiatives in Cameroon. By centering public secondary schools in Buea-CRM, the study responds to calls for localized research that reflects the lived realities of digitalized schooling in developing contexts (UNESCO, 2023). Ultimately, this study strengthens the scholarly discourse on e-learning access by bridging global theories with local empirical realities, thereby supporting more inclusive and sustainable digital education strategies.

### **Methods**

This study investigated the challenges and opportunities associated with accessing e-learning in digitalized public secondary schools in Buea-CRM. The primary objective was to examine the extent to which infrastructural, institutional, and socio-economic factors influenced access to e-learning among students and teachers. The study employed a systematic research approach that enabled the collection of both quantitative and qualitative data from relevant stakeholders. Data were obtained through questionnaires and interviews administered to selected participants in digitalized public secondary schools. The results identified key access-related challenges such as limited connectivity, insufficient digital skills, and inconsistent institutional support, alongside opportunities including flexible learning, increased access to digital resources, and enhanced learner engagement. The study concluded that access to e-learning in digitalized public secondary schools was shaped by the interaction of technological readiness, user competence, and supportive school environments.

## Research Design

The study adopted a descriptive survey research design. This design was appropriate because it enabled the systematic description of existing conditions related to e-learning access without manipulating any variables (Creswell & Creswell, 2018). The descriptive survey design allowed the researcher to capture participants' experiences, perceptions, and practices regarding e-learning within their natural school settings. The design also supported the collection of data from a relatively large population, thereby enhancing the generalizability of findings within the context of public secondary schools in Buea-CRM (Bryman, 2016).

Both quantitative and qualitative components were incorporated to strengthen the methodological rigor of the study. The quantitative component provided measurable indicators of access-related challenges and opportunities, while the qualitative component offered contextual explanations that enriched the interpretation of findings (Fraenkel, Wallen, & Hyun, 2019).

## Population and Sample

The target population comprised students, teachers, and school administrators in digitalized public secondary schools within Buea-CRM. These groups were selected because they represented the primary users, facilitators, and managers of e-learning systems. The population included all public secondary schools in the area that had been officially identified as digitalized through the provision of ICT infrastructure such as computers, internet connectivity, and digital learning platforms. From this population, a sample was drawn to ensure manageability and depth of analysis. The sample included students who had participated in e-learning activities, teachers who used digital tools for instructional purposes, and administrators responsible for ICT coordination and policy implementation. The selection of this sample was guided by methodological recommendations emphasizing relevance, representativeness, and feasibility in educational research (Cohen, Manion, & Morrison, 2018).

## Sampling Technique

The study employed a purposive sampling technique. This technique was selected because it allowed the researcher to intentionally choose participants who possessed direct experience with e-learning in digitalized public secondary schools (Etikan, Musa, & Alkassim, 2016). Purposive sampling ensured that data were collected from individuals who could provide meaningful and informed responses regarding access-related challenges and opportunities. Within each selected school, students who had used e-learning platforms, teachers involved in ICT-supported instruction, and administrators overseeing digital initiatives were purposively selected. This approach enhanced the relevance and credibility of the data by focusing on participants with firsthand knowledge of the phenomenon under investigation.

## Data Collection Methods

Data were collected using questionnaires and semi-structured interviews. Questionnaires were administered to students and teachers to gather quantitative data on access to e-learning, availability of digital resources, frequency of use, and perceived challenges and opportunities. The use of questionnaires facilitated the efficient collection of standardized data from multiple respondents within a limited timeframe (Creswell & Creswell, 2018). Semi-structured interviews were conducted with selected school administrators. This method allowed the

researcher to explore institutional perspectives on ICT implementation, policy enforcement, and support mechanisms influencing e-learning access. Interviews provided flexibility for probing emerging issues and capturing detailed contextual information, consistent with qualitative research best practices (Braun & Clarke, 2006).

### **Research Instruments**

The primary research instruments consisted of a structured questionnaire and a semi-structured interview guide. The questionnaire contained closed-ended items organized into sections addressing infrastructural access, digital skills, institutional support, and perceived opportunities for e-learning. Responses were measured using a Likert-type scale to capture varying degrees of agreement and frequency. The interview guide included open-ended questions designed to elicit administrators' experiences with digitalization, challenges in supporting e-learning, and perceived benefits of digitalized school environments. The instruments were developed based on established literature on e-learning access and digital education (Selwyn, 2016; van Dijk, 2020).

### **Validity and Reliability**

Validity was ensured through content and face validity procedures. Content validity was achieved by aligning the research instruments with key constructs identified in the literature on digital access and e-learning (Tondeur et al., 2017). Experts in educational research and ICT integration reviewed the instruments to assess clarity, relevance, and comprehensiveness. Reliability was established through a pilot study conducted in a public secondary school outside the main study area. Feedback from the pilot study informed revisions to ambiguous or redundant items. Internal consistency of the questionnaire items was ensured by adhering to reliability standards outlined by Nunnally (1978), thereby enhancing the consistency of measurements across respondents.

### **Data Analysis Techniques**

Quantitative data collected through questionnaires were analyzed using descriptive statistical techniques, including frequencies and percentages. These techniques were appropriate for summarizing patterns related to access challenges and opportunities and for presenting findings in a clear and interpretable manner (Creswell & Creswell, 2018). Qualitative data from interviews were analyzed using thematic analysis. Interview transcripts were systematically coded to identify recurring themes related to infrastructural constraints, institutional support, and enabling factors for e-learning access. Thematic analysis was selected for its flexibility and effectiveness in interpreting qualitative data within educational research contexts (Braun & Clarke, 2006).

### **Ethical Considerations**

Ethical considerations were strictly observed throughout the study. Authorization was obtained from relevant educational authorities and school administrators prior to data collection. Participants were informed about the purpose of the study, and informed consent was obtained before their participation. Confidentiality and anonymity were maintained by excluding names and identifiable information from data records and reports. Participants were informed of their right to withdraw from the study at any stage without negative consequences. These procedures

aligned with established ethical standards for educational research involving human participants (Cohen et al., 2018).

## Results

This section presented the raw data and empirical findings of the study on the challenges and opportunities for accessing e-learning in digitalized public secondary schools in Buea-CRM. The results were obtained from questionnaire responses administered to students and teachers, as well as structured interview schedules completed by school administrators. Data were analyzed descriptively and reported using frequencies and percentages, in line with accepted standards for presenting survey research findings (Creswell & Creswell, 2018). The results were organized under descriptive statistics, tables and figures, and key data points. No interpretation was included.

### Descriptive Statistics

The descriptive statistics presented respondents' demographic characteristics and reported access-related variables using percentages to reflect the distribution of responses across the study sample (Fraenkel, Wallen, & Hyun, 2019). Students constituted 66% of the respondents, teachers accounted for 27%, and school administrators represented 7%. With respect to gender, 55% of respondents were male and 45% were female. Among teachers, 42% reported having 1–5 years of teaching experience, 35% reported 6–10 years, and 23% reported more than 10 years. Among students, 59% were enrolled in upper secondary classes, while 41% were in lower secondary classes.

Regarding access to school-based digital infrastructure, 74% of respondents reported the presence of computer laboratories in their schools, while 26% reported limited or non-functional facilities. Of those reporting the presence of computer laboratories, 61% indicated that computers were shared among multiple students, while 39% reported individual or near-individual access during scheduled ICT sessions. Access to projectors and digital presentation tools was reported by 48% of teachers, while 52% reported no access to such tools within their classrooms. Access to personal digital devices varied across respondents. 82% of students reported having access to smartphones for academic purposes, while 18% reported no access to any personal digital device. Access to personal laptops or tablets was reported by 37% of respondents, while 63% reported no access to such devices. Among teachers, 69% reported using personal laptops or tablets for instructional preparation, while 31% reported reliance solely on school-based devices.

School-based internet connectivity was reported by 65% of respondents, while 35% reported no internet access within their schools. Among respondents with school internet access, 46% reported intermittent connectivity, 31% reported slow connectivity, and 23% reported stable connectivity. Home-based internet access among students was reported by 36%, while 64% reported no home internet access. Of those without home internet access, 58% reported reliance on mobile data, while 42% reported no access to internet services outside school. Regarding frequency of e-learning use, 49% of respondents reported occasional use of e-learning platforms, 28% reported regular use, and 23% reported rare or no use. Among teachers, 44% reported using digital tools for lesson preparation at least once per week, while 56% reported less frequent use. Students reported engagement with e-learning platforms for assignments (46%), accessing notes (62%), and communication with teachers (39%).

Digital skills among respondents were reported at varying levels. 71% of teachers reported proficiency in basic computer applications such as word processing and presentation software. Advanced skills related to learning management systems were reported by 29% of teachers. Among students, 77% reported basic digital skills such as browsing the internet and downloading learning materials. Skills related to uploading assignments and participating in online discussions were reported by 34%, while 23% reported skills related to creating digital content. Institutional support indicators showed that 45% of respondents reported having received some form of ICT or e-learning training, while 55% reported no formal training. Access to technical support personnel was reported by 41%, while 59% reported no access to on-site technical assistance. Administrative encouragement for e-learning use was reported by 53% of teachers, while 47% reported limited or no encouragement.

Opportunities associated with accessing e-learning were documented using percentage distributions. Access to online learning materials was reported by 64% of respondents. The use of digital platforms for assignment submission was reported by 48%, while 42% reported access to digital communication platforms such as email or messaging systems. Flexible access to learning resources beyond regular school hours was reported by 38% of students. Participation in online collaborative learning activities was reported by 31% of respondents.

### **Key Data Points**

Several key numerical findings emerged from the data. 74% of respondents reported the presence of computer laboratories in their schools. Internet access within schools was reported by 65%, though 77% of those respondents reported some form of connectivity limitation. Access to personal learning devices was reported by 37%, while 82% of students relied primarily on smartphones. Basic digital skills were reported by 77% of students, while advanced e-learning platform skills were reported by 23%. Institutional training opportunities were reported by 45%, while 55% reported no training. Technical support availability was reported by 41%, while 59% reported no support staff.

Opportunities related to e-learning included access to digital learning materials (64%), online assignments (48%), and digital communication tools (42%). Flexible learning access beyond school hours was reported by 38% of students. Administrator data showed that 100% of participating schools had ICT policies in place, while 61% reported challenges related to infrastructure maintenance. Efforts to expand e-learning initiatives were reported by 63% of administrators. These results provided a quantitative description of access-related conditions in digitalized public secondary schools in Buea-CRM and formed the empirical basis for subsequent discussion (Creswell & Creswell, 2018).

### **Discussion**

This section interprets the findings on the challenges and opportunities for accessing e-learning in digitalized public secondary schools in Buea-CRM. The discussion relates the results to the study's guiding questions, existing empirical and theoretical literature, and broader educational implications. Interpretation is presented in the present tense, while references to specific findings are presented in the past tense.

## Explanation of Key Results

The findings indicate that access to e-learning in public secondary schools in Buea-CRM remains uneven despite ongoing digitalization efforts. Although a majority of respondents reported the presence of computer laboratories, access was constrained by shared usage, limited functionality, and inconsistent internet connectivity. This suggests that physical availability of ICT infrastructure does not automatically translate into effective e-learning access, supporting the view that access is multidimensional and includes quality, reliability, and usability components (van Dijk, 2020). The results show that smartphones constituted the most accessible digital device for students, while access to laptops and tablets remained limited. This pattern reflects a form of mobile-dependent learning, where e-learning access is shaped more by personal devices than by institutional provision. The reliance on smartphones aligns with broader trends in low- and middle-income contexts, where mobile technologies compensate for infrastructural gaps in formal education systems (Traxler, 2018). However, the findings also indicate that smartphone access alone does not ensure structured engagement with e-learning platforms, as regular e-learning use remained relatively low.

The findings further reveal that while basic digital skills were widely reported among both students and teachers, advanced skills related to structured e-learning platforms, online collaboration, and digital content creation were less prevalent. This suggests that digital literacy in the study context remains largely functional rather than pedagogical. Such a skills gap limits the transformative potential of e-learning and reinforces the importance of targeted capacity-building initiatives (Redecker, 2017). Institutional support emerged as a critical factor shaping access to e-learning. Although some respondents reported administrative encouragement and training opportunities, a majority indicated limited formal training and insufficient technical support. This pattern highlights the institutional dimension of the digital divide, where policy intentions are not always matched by operational support mechanisms (Selwyn, 2016).

## Comparison with Existing Literature

The findings are consistent with prior studies conducted in Sub-Saharan Africa, which report that digitalization initiatives in public secondary schools often prioritize infrastructure acquisition over sustained usability and pedagogical integration (Tchamyou, Erreygers, & Cassimon, 2019). Similar studies in Cameroon and comparable contexts show that computer laboratories and internet connections are frequently underutilized due to maintenance challenges, power instability, and limited teacher preparedness (Nfor & Tambo, 2021). The dominance of smartphones as the primary access device aligns with findings from mobile learning research, which emphasizes the role of personal devices in expanding access to digital education in resource-constrained settings (UNESCO, 2021). However, existing literature also cautions that mobile-based access may reinforce inequities when data costs, device quality, and platform compatibility are not adequately addressed (Crompton & Burke, 2018). The study's findings reflect this tension, as smartphone access coexisted with low levels of consistent e-learning engagement.

The reported levels of digital skills correspond with studies indicating that students and teachers often possess basic operational skills but lack competencies related to instructional design, online assessment, and collaborative learning (Koehler, Mishra, & Cain, 2015). This supports the relevance of the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the integration of technology with pedagogy and subject content rather than

isolated technical proficiency. Furthermore, the findings reinforce van Dijk's (2020) theory of the digital divide, which conceptualizes access as encompassing motivational, material, skills, and usage dimensions. While material access was partially present in the study context, skills and usage gaps persisted, limiting meaningful participation in e-learning. This multidimensional interpretation aligns with international evidence that digital inequality increasingly manifests in how technologies are used rather than whether they are available (OECD, 2020).

## **Implications**

The findings imply that digitalization policies in public secondary schools should move beyond infrastructure provision to focus on sustained access and pedagogical integration. Access to e-learning is interpreted as a systemic issue involving infrastructure quality, digital skills development, institutional support, and affordability. Policymakers and educational administrators are therefore encouraged to adopt holistic digital education strategies that address these interrelated dimensions. For schools, the results imply a need to strengthen institutional support structures, including regular teacher training, technical assistance, and leadership-driven encouragement for e-learning adoption. Capacity-building initiatives are essential to shift digital skills from basic usage to pedagogically meaningful application, consistent with contemporary digital competence frameworks (European Commission, 2022).

The findings also suggest that mobile learning strategies can be formally integrated into secondary education, given the widespread availability of smartphones. However, such integration requires clear guidelines, curriculum alignment, and safeguards to ensure equitable access and responsible use. Leveraging mobile technologies strategically may enhance flexibility and continuity of learning, particularly in contexts affected by infrastructural disruptions. At a broader level, the study underscores the importance of contextualized e-learning models that reflect local realities, including economic constraints, infrastructural limitations, and existing digital practices. This implication resonates with calls for culturally responsive and context-sensitive digital education policies in the Global South (Adam, 2020).

## **Recommendations**

Based on the findings of this study on challenges and opportunities for accessing e-learning in digitalized public secondary schools in Buea-CRM, several recommendations are proposed to enhance digital learning access and outcomes across similar contexts. These recommendations address policy, educational strategies, future research, and social impact, while providing insights that can be extended to different cultures or populations.

Policymakers are encouraged to adopt comprehensive digital education policies that integrate infrastructure provision, teacher capacity building, and equitable access strategies. Policies should prioritize reliable internet connectivity, procurement of functional digital devices, and affordable data solutions to ensure that all students, irrespective of socioeconomic background, can engage in e-learning. Governments may also consider public-private partnerships to support sustainable digital resource provision and maintenance. The findings suggest that policy frameworks must move beyond material access to include digital skills development, technical support, and pedagogical guidance, reflecting multidimensional perspectives on the digital divide (van Dijk, 2020; OECD, 2020).

School administrators and educators should implement structured professional development programs that enhance teachers' pedagogical and technological competencies. Training should focus on using e-learning platforms effectively, integrating mobile learning into curricula, and designing interactive digital content. Schools should establish dedicated ICT support units to provide timely technical assistance and maintain digital equipment. Leveraging mobile learning strategies, given the high prevalence of smartphones, can expand access while promoting flexible learning opportunities beyond traditional classroom settings (Traxler, 2018; Redecker, 2017).

Future research should explore the relationship between e-learning access and learning outcomes, motivation, and student engagement using longitudinal or mixed-methods designs. Comparative studies across regions, school types, and cultural contexts may reveal structural inequalities and best practices applicable to diverse populations. Researchers may also examine the effectiveness of specific digital tools and pedagogical interventions in promoting equitable access to e-learning, thereby extending theoretical frameworks such as the Technological Pedagogical Content Knowledge (TPACK) model to new educational environments (Koehler et al., 2015).

E-learning initiatives should involve community engagement to ensure inclusivity and sustainability. Parental awareness campaigns, community-led digital literacy programs, and partnerships with local organizations can enhance learners' access to digital resources at home and in community centers. By fostering a culture of digital literacy and participation, schools and communities can collectively reduce inequities in educational access and empower learners to thrive in digitally mediated environments (Adam, 2020; UNESCO, 2021).

## **Conclusion**

This study examines the challenges and opportunities associated with accessing e-learning in digitalized public secondary schools in Buea-CRM. The findings demonstrate that while digitalization initiatives increase the visibility of information and communication technologies in schools, access to e-learning remains constrained by infrastructural, institutional, and skills-related factors. Although many schools possess basic ICT facilities and students widely access smartphones, consistent and effective engagement with e-learning platforms remains limited due to unreliable internet connectivity, insufficient devices, limited technical support, and uneven digital competencies. At the same time, opportunities emerge through growing mobile access, positive attitudes toward digital learning, and increased policy attention to ICT integration in education (UNESCO, 2021; van Dijk, 2020).

In terms of contributions to knowledge, the study extends existing literature by providing context-specific evidence from public secondary schools in Buea-CRM, an area that remains underrepresented in empirical research on e-learning access. The study reinforces the multidimensional nature of digital access by illustrating how material availability, skills development, and institutional support interact to shape e-learning participation. By applying digital divide and technology integration perspectives within a localized educational context, the research deepens understanding of how global digital education frameworks manifest in resource-constrained settings (Selwyn, 2016; Tchamyou et al., 2019).

The findings hold important practical applications for educational stakeholders. School administrators and policymakers are encouraged to move beyond infrastructure-focused digitalization strategies and prioritize capacity building, sustainable technical support, and inclusive access models. Integrating mobile learning approaches into formal secondary education can further expand access, provided that clear usage guidelines, affordable connectivity, and curriculum alignment are ensured. Teacher professional development programs that emphasize pedagogical uses of digital tools are also essential for translating access into meaningful learning experiences (Koehler et al., 2015).

The study suggests several directions for future research. Further studies may explore the relationship between e-learning access and academic performance using mixed-methods or longitudinal designs. Comparative research across regions, school types, or socioeconomic contexts may also provide deeper insights into structural inequalities in digital education. Additionally, future research may investigate learners' experiences and engagement patterns to better understand how e-learning access influences motivation, inclusion, and educational equity in secondary schools.

## References

- Adam, T. (2020). *Digital inclusion and education: Challenges and strategies in the Global South*. Routledge.
- American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). Washington, DC: Author.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.
- Crompton, H., & Burke, D. (2018). Mobile learning in schools: A framework and evaluation. *Journal of Computer Assisted Learning*, 34(4), 404–415. <https://doi.org/10.1111/jcal.12237>
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- European Commission. (2022). *Digital competence framework for educators (DigCompEdu)*. Publications Office of the European Union.
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). *How to design and evaluate research in education* (10th ed.). McGraw-Hill Education.
- Koehler, M. J., Mishra, P., & Cain, W. (2015). What is technological pedagogical content knowledge (TPACK)? *Journal of Education*, 195(1), 13–25.
- Nfor, F., & Tambo, W. (2021). ICT integration in secondary education in Cameroon: Opportunities and constraints. *African Journal of Educational Studies*, 14(2), 45–63.
- OECD. (2020). *Education at a glance 2020: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/69096873-en>
- Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.

- Selwyn, N. (2016). *Education and technology: Key issues and debates* (2nd ed.). Bloomsbury Academic.
- Tchamyou, V. S., Erreygers, G., & Cassimon, D. (2019). ICT and educational outcomes in Sub-Saharan Africa. *World Development*, *119*, 1–15. <https://doi.org/10.1016/j.worlddev.2019.02.004>
- Tijssen, R. J. (2007). Africa's contribution to the worldwide research literature. *Scientometrics*, *71*(2), 303–327.
- Traxler, J. (2018). Mobile learning for the digitally underserved: An overview. *International Review of Research in Open and Distributed Learning*, *19*(5), 1–15. <https://doi.org/10.19173/irrodl.v19i5.3584>
- UNESCO. (2021). *Digital learning for all: Policies and practices in secondary education*. UNESCO Publishing.
- van Dijk, J. (2020). *The digital divide* (3rd ed.). Polity Press.