Instructors' challenges of using information communication and technology in geography instruction: case of William Vacanrat Shadrach Tubman College, Liberia

[1]**Pewu Emmanuel Toll, Jr.,** [2]**Prof. Samson Rosana Ondigi,** [3]**Florence Abuyeka Miima**

[1]Postgraduate Student, Educational Communication and Technology, School of Education, Kenyatta University, Nairobi, Kenya
[2]Professor, Educational Communication and Technology, School of Education, Kenyatta University, Nairobi, Kenya
[3]Lecturer, Educational Communication and Technology, School of Education, Kenyatta University, Nairobi, Kenya
Email: [1]emmanuel.toll@yahoo.com, [2]ONDIGI.SAMSON@ku.ac.ke, [3]MIIMA.ABUYEKA@ku.ac.ke
ORCID: [1]https://orcid.org/0009-0003-7834-6546, [2]https://orcid.org/0000-0001-6443-4818, [3]https://orcid.org/0000-0002-2132-6785

Abstract: *In today's digital age, ICT utilization in the classroom is crucial for students to learn and apply 21st-century skills. It significantly improves geography teaching and learning environments by allowing instructors to document students' field trips and other learning outcomes. ICT software saves time and delivers higher-quality outcomes, while the internet expands access to reliable geographic data and information sources. ICT software simplifies geographic concepts, provides easily accessible data, and improves spatial awareness and decision-making abilities. Simulations and modelling tools enhance understanding of geographical problems such as natural vegetation, weather patterns, erosion, and agriculture. ICT also enhances higher-level thinking skills, particularly for students using ICT. This article highlights instructors' opinions about the problems they encounter when integrating ICT in the classroom. A descriptive design was adopted, whereby questionnaires and interview schedules were used to collect the data. Random sampling was used to sample six (6) geography instructors and ten (10) administrators from the targeted population at the Williams V.S. College of Education in Liberia. The findings showed that ICT resources were inadequate; the respondents experienced problems of network connectivity, limited technical support, the non-existence of stable electric power supply, the absence of ICT infrastructure, poor internet connection, the unavailability of support from college administrators, and a lack of effective training. From the findings, it is recommended that all the educational stakeholders look for ways of solving the problems and challenges of effective integration of technology into schools' teaching and learning processes. The ministry of education should conduct frequent refresher courses to equip curriculum implementers with adequate and proper skills on how to utilize the available ICT resources in schools and colleges.*

Key Words: *ICT tools, ICT utilization, Instructors, Instruction, geography, geographical data, Decision-making.*

1. INTRODUCTION:

Information and communication technology, or ICT for short, is transforming the way we work and live in public. We should take into account all of the current advanced innovation applications that are available to assist individuals, organizations, and groups in using data when we think about ICT at this time. Technology has advanced significantly over the past few decades and now offers a wide range of features, such as cataloging and upgrading. In an effort to encourage people to use the shorter ICT, it has recently become popular to broaden the phrase to include the field of electronic correspondence (information and communication technology). With the development of ICT globally, numerous authors have emphasized the advantages of integrating technology into education (UNESCO, 2023).

Nations all over the world, including Liberia, have recognized the critical role that information and communication technology (ICT) plays in all aspects of human endeavor, including education (Lidstrom & Hemmingsson, 2014; Ghavifekr et al., 2016; Bariu, 2020; Adarkwa, 2021). Its importance has grown in the aftermath of the COVID-19 pandemic, when most educational institutions were forced to develop ways to engage their students from home (Agyei, 2021; Karakostantaki & Stavrianos, 2021; Basaran & Yalman, 2022). Integrating technology in school is critical for helping instructors improve their educational progress and technical dexterity. It alleviates anxiety during lesson preparation. If used successfully, it also increases student interest over time (Gulbahar & Guven, 2008; Adarkwah, 2021). Despite the widespread use of ICT, it is nevertheless typical in Liberia to come across second-cycle students and instructors who are untrained in computer use. According to Smith et al. (2005), one of the motivations for using technology in the education sector is to aid in the modernization of schools and to educate students with the skills necessary to use such technology effectively. Like any other thing, ICT has its shortcomings. Although there have been numerous advocacy efforts in this area, using ICT in teaching and learning in Ghana was not common until the COVID-19 epidemic broke out (Antwi et al., 2018).

A study on the effective use of ICT for learning and teaching geography conducted by Kadhim (2020) showed that geography teachers need to understand the relationship between technological pedagogical content knowledge (TPCK) and geography subjects to teach them in an effective way, such as with the GIS application within the classroom. The study shows that GIS and RS are types of ICT tools that can be used in learning and teaching geography in higher education, but it seems to be a complex way of teaching in secondary schools. Moreover, teachers have limited knowledge and skills when using GIS in primary schools (Kadhim, 2020). The lack of resources, infrastructure, and supports and their scarcity made it difficult to integrate and use ICTs. It was noted that most ICT resources could only be used for their most basic purposes by teachers and students (Chirwa & Mubita, 2021). This study came to the conclusion that, in order to improve the effective integration of ICTs in the teaching and learning of geography, teachers and students must be given access to sufficient ICT resources. It's crucial for school administration to allocate enough funds so that teachers can attend workshops where they can learn how to incorporate ICTs into the teaching and learning of geography (Chirwa & Mubita, 2021). The use of ICT in geography permits university students to examine by giving them proper access to large portions of facts about people, places, and environments. It also serves as a statistical evaluation framework to take a look at styles and relationships in a geographic context. Once the scholars have made their discoveries, ICT can help them organize, edit, and gift the data in specific ways (TeachingTime, 2023). ICT offers instructors and college students immediate access to modern and up-to-date geographic facts and our surprisingly related world. It is a dynamic medium that, when used correctly, can notably amplify and deepen geographic expertise and knowledge in methods by no means earlier than seen. In addition, it has been shown that students often maintain a higher level of concentration when given the opportunity to support their learning with ICT (TeachingTime, 2023).

The need for teachers to receive professional development opportunities to enhance their ICT skills for formative learning assessments, individualized instruction, online resources, and student interaction. ICT training increases student engagement, enabling interactive, dynamic lessons catering to diverse learning styles and abilities (ICTE Solutions Australia, 2021). A level chemistry teachers face challenges in fully integrating and utilizing ICT due to their lack of exposure and training, as well as limited access to resources like computers and the internet. Although most teachers have a positive attitude towards ICT, female teachers face greater difficulties. The study recommends implementing distinct ICT educational methodologies, providing resources like computers and ICT training programs, and ensuring pre-service teachers have good technology exposure and experiences in various ICTs (Kujeke et al., 2017). Kennedy (2020) study reveals that the William V.S. Tubman College of Education faces major barriers to ICT integration in teacher education programs due to a lack of ICT infrastructure, equipment, teacher support, insufficient experience, and training. The integration process is complicated by instructors' lack of experience, training, and limited resources.

Objectives of the study: The article sort to, establish the challenges experienced by geography instructors while utilizing ICT resources during geography instructions.

Theoretical framework: This study, reinforced by Koehler et al. (2013), identified three cardinal knowledge for improving education quality in the 21st century: technological knowledge (TPACK), content knowledge (TCK), and pedagogical knowledge (PK). The TPACK model focuses on the integration and utilization of ICT in geography teaching and learning, encompassing technological knowledge (TK), content knowledge (PK), and pedagogical knowledge (PK). The three cardinal knowledge intersect at significant points for contextualization, with Technological Pedagogical Knowledge (TPK) being the intersection of technological and pedagogical knowledge, Technological

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Content Knowledge (TCK) being the intersection of technological and content knowledge, and a common core called Technological Pedagogical Content Knowledge (TPACK).

Figure 1:Theretical framework
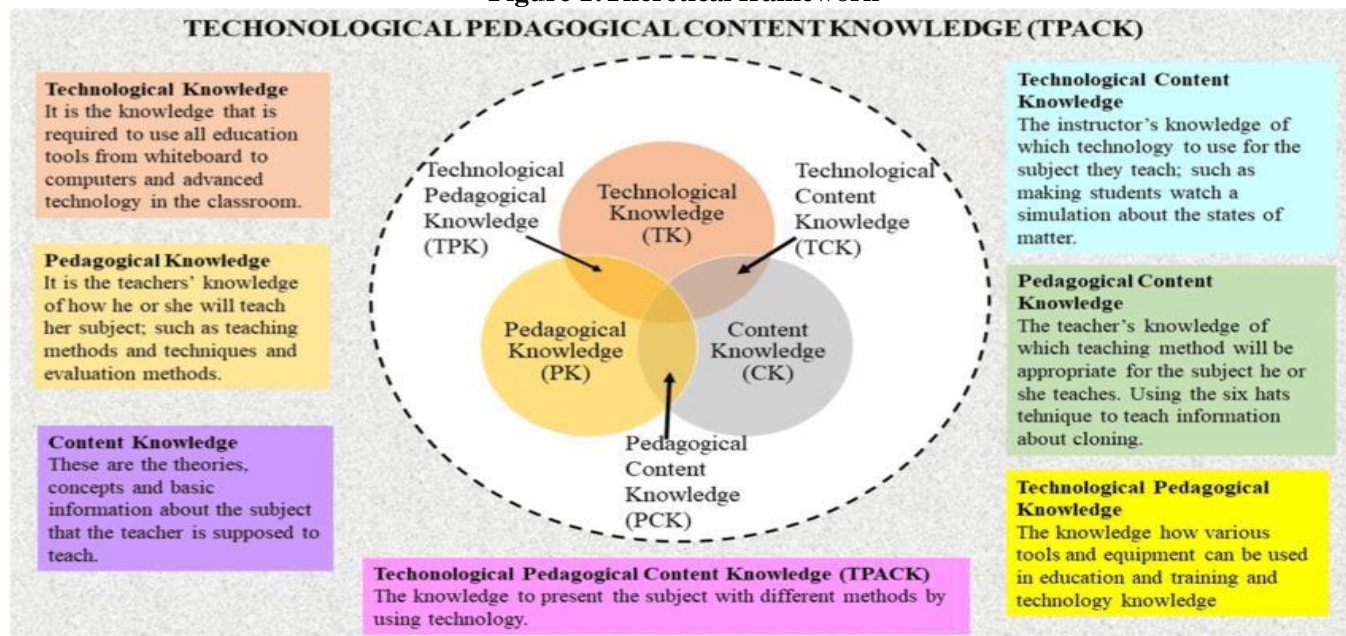
Source: Koehler et.al., (2013)

However, as long as we are aware of the TPACK framework, we will incorporate technology into the lessons we teach and the ways in which they are taught. Issues occur when technology is viewed as a separate body of knowledge. The integration will improve students' ability to learn. Manual curriculum adaptation and instructor training, according to Mishra and Koehler, are crucial elements of TPACK. They describe a process in which we first decide the learning objectives we will focus on for that particular day or class period. The learning objective is the content. Selecting an activity type is the second action they advise. The activity type serves as a representation of the pedagogy, or the method through which the students will learn the material. Finally, we can choose technologies that will support the activity type and aid in the education of the students. This approach, which captures every aspect of successful technology integration and utilization during geography instruction, is essential to this study.

2. LITERATURE REVIEW: A study in Malaysia by Ghavifekr et al. (2023) analyzed teachers' perceptions of challenges in using ICT tools in classrooms. A sample of 100 secondary school teachers in Melaka, Malaysia, was randomly selected. Key challenges identified were limited accessibility, network connection, technical support, lack of effective training, limited time, and a lack of teachers' competency. The results showed that male teachers used ICT tools more (M =2.08, SD =.997) in the classroom compared to female teachers (M = 2.04, SD =.997). Gul et al. (2023) studied teachers' perspectives on challenges and possibilities in online education during the COVID-19 pandemic in Balochistan, Pakistan. They found that schools have digital equipment but face obstacles like insufficient electricity, funding, slow internet connections, and inadequate teacher training. The study suggests collaboration between donor agencies, educational stakeholders, and elected representatives to develop digital infrastructure for quality education and lifelong learning.

Mhishi et al. (2023) found that geography teachers in Zimbabwe were less prepared for e-learning during the COVID-19 lockdowns, while boarding schools were better prepared. Factors hindering teacher preparedness included inadequate training, infrastructure, and the popularity of WhatsApp as a communication tool. The study recommends mobilizing stakeholder support for teacher capacity. Rahayu et al. (2022) investigated the experiences of eight Indonesian secondary school teachers during the COVID-19 pandemic using technology. The research uses semi-structured interviews and qualitative research to explore technology access, online teaching difficulties, adaptability, and experiences. The findings suggest that forced changes in teaching could impact the professionalization of teacher education in the digital age. Teachers struggled with explaining lessons and ensuring students understood, and learning relied heavily on internet connections.

Online teaching has gained popularity in developed countries, but in developing countries, it is not widely recognized. Distance learning has reduced teachers' and students' introversion to e-learning and technology, providing a platform for learning new technologies and skills. However, the COVID-19 lockdown has led to challenges in implementing e-learning in schools. A study using Google Forms surveyed high school and primary school English teachers, finding that most had negative perceptions of e-learning due to a lack of essential facilities, skills, and student contributions. To overcome these limitations, research suggests introducing Information Communication and Technology modules across media platforms, opening intensive courses for teachers, and developing educational facilities in education departments and schools (Sofi-Karim et al., 2022). The study by Mensah et al. (2021) assessed Senior High School Geography teachers' knowledge of integrating technology into their classrooms using the Technological Pedagogical Content Knowledge (TPACK) model. A survey of 113 teachers revealed high content and pedagogical knowledge in geography. However, teachers were less confident in their technological knowledge, lacking ICT skills, infrastructure, and resources for geography instruction. The study recommends integrating ICTs into higher education courses to help students understand the role of specific technologies, hardware, and software in their respective disciplines.

Geographic Information Systems (GIS) has gained popularity in South Africa's senior high school curriculum, but matriculation pass rates in national examinations are low. This research investigated teachers' teaching methods in high schools in the Frances Baard district, Northern Cape Province. The mixed-methods approach and multiple-case study design were used, revealing that most teachers used teacher-centered approaches, such as lecturing, explanation, and questioning, at the expense of learner-centered approaches. Challenges like limited resources, large classes, inadequate training, and time constraints hindered the use of learner-centered teaching methods. The study proposes a paradigm shift in GIS teaching by using learner-centered methods that encourage students to actively create knowledge through their own experiences. GIS topics should be taught in GIS laboratories, combining theory and practical application (Hlatywayo & Manik, 2022). Asamoah et al., (2022) study aimed to explore the use of ICT in Ghana's second-cycle educational institutions, focusing on the integration of ICT in teaching and learning. A survey of 182 students and 70 teachers was conducted, revealing a positive perception of ICT integration. Challenges faced included unstable power supplies, system breakdowns, unstable internet access, and the unavailability of ICT integration support staff. The study recommended providing ICT facilities in all classrooms, expanding the teacher and student laptop project, and expanding internet access points in schools.

A study in Uganda by Habibu et al. (2012) examined the difficulties faced by teachers in integrating Information and Communication Technology (ICT) in classroom teaching and learning in technical and higher educational institutions. The study involved 55% of 150 teachers and 57% of administrators. The results showed that teachers had a strong desire to integrate ICT into the teaching-learning process but faced major barriers such as a lack of genuine software, inadequate computers, low-speed internet, a lack of motivation, inadequate training skills, the unavailability of the latest equipment, expert technical staff, poor administrative support, and a poor course curriculum. The study suggests ongoing professional development for teachers to model new pedagogies and tools to enhance the teaching-learning process. It is crucial for teacher trainers and policymakers to understand the barriers and cost-effectiveness of different approaches to ICT use in teacher training to develop suitable training strategies for all.

A study in Uganda by Habibu et al. (2012) found that teachers in technical and higher educational institutions face challenges in integrating ICT into classroom teaching and learning. Major barriers include a lack of genuine software, inadequate computers, low-speed internet, motivation, training skills, equipment availability, expert technical staff, poor administrative support, and a poor course curriculum. The study recommends ongoing professional development for teachers to model new pedagogies and tools and focuses on understanding the barriers and cost-effectiveness of different ICT training approaches for suitable strategies. The study at the College of Education in Liberia aimed to explore the challenges of ICT integration in teachers' education. Results showed a lack of infrastructure, equipment, support, experience, and training. To address these issues, teacher training programs should be equipped with ICT infrastructure, empowering teachers to effectively apply ICT. The study recommends including ICT as a core subject in teachers' colleges' curricula for Liberia's 2030 vision (Kennedy, 2023).

3. MATERIALS: Questionnaires, Interview guide, and Observation checklist

4. METHOD: Research Design
The researcher used a descriptive survey research design in the study because it was appropriate for collecting primary data about geography instructors' ICT challenges and provided an opportunity to investigate phenomena involving a

qualitative and quantitative approach. This research approach aided in gathering complete and possibly correct data from the research subjects, which was then used for detailed analysis and led to key suggestions.

Targeted Population
The target population of this study was geography instructors at the college of education and administrators. The population for the study consisted of 10 administrators, 12 geography instructors, 7 part-time instructors, and 1233 students of the University of Liberia, Montserrado County. The researcher involved all 10 administrators and 12 geography instructors.

Sampling Techniques and Sample Size
This study used the purposive sampling technique to handpicked 10 administrators, 4 geography instructors and 2 part-time geography instructors from the College of Education of the University of Liberia because they provided direct responses to the research questions.

5. ANALYSIS: The study utilized SPSS version 26.0 for analysis, focusing on quantitative and qualitative data from geography instructors and administrators. The data was coded and cleansed to ensure accuracy. Descriptive statistics were used to analyse quantitative data from closed-end questionnaire items, while central tendency measures were used to determine mode and mean. Spread measures were used to calculate the standard deviation. Qualitative data was transcribed, categorized, and coded to provide a descriptive narrative of respondents' viewpoints, experiences, and opinions.

6. FINDINGS :

Table 1: College's Infrastructure Readiness to Complement Geography instructors

Statement	Strongly disagree		Disagree		Agree		Strongly agree		Mean	SD
	f	%	f	%	f	%	f	%		
I believe that the College has the resources necessary to use ICT in the classroom when teaching geography.	4	66.7%	2	33.3%	0	0.0%	0	0.0%	1.3	0.5
My college offers ICT workshops and trainings to give instructors the specialized ICT knowledge they need.	3	50.0%	3	50.0%	0	0.0%	0	0.0%	1.5	0.5
My college can provide technical support for e-learning while utilizing ICT.	0	0.0%	4	66.7%	2	33.3%	0	0.0%	2.7	1.0
My college has a good Internet connection.	2	33.3%	4	66.7%	0	0.0%	0	0.0%	1.7	0.5
My college has infrastructure that can support e-learning using ICT resources.	0	0.0%	1	16.7%	3	50.0%	2	33.3%	3.3	0.8
My college, I believe, has enough computer labs to support e-learning of geography through the use of ICT resources.	2	33.3%	4	66.7%	0	0.0%	0	0.0%	1.7	0.5
My college's computer labs are equipped with cutting-edge technology for implementing e-learning with ICT resources for geography instructions.	1	16.7%	5	83.3%	0	0.0%	0	0.0%	1.8	0.4

This study aimed to assess the college's infrastructure readiness to support geography instructors in their teaching and learning activities using ICT resources. The results showed that 66.7% of teachers strongly disagreed with the statement that colleges have the resources needed to use ICT in the classroom to teach geography. They also disagreed with the statement that colleges can provide ICT workshops and trainings to equip teachers with the specific ICT expertise they require. The majority of instructors claimed that the college's ICT infrastructure was insufficient to support geography teaching and learning, negatively affecting students' geography achievement. The findings also revealed that geography instructors used little or no ICT resources during instruction, implying that geography is taught as an abstract subject that cannot allow students to explore their learning. The college's administrators have been working with education stakeholders and partners to calibrate and enhance its ICT infrastructure, offer top-notch ICT skills training, and supply essential and pertinent ICT resources for geography teaching and learning. The findings align with Antwi et al. (2018) revelation that instructors lack access to the ICT tools required to teach geography subjects. Al-Mamary (2020) revealed the lack of instructors' knowledge and access to ICT infrastructure, as well as their availability for technical support, spare time, and ICT training to advance their ICT abilities. The usage of ICT by teachers is influenced by infrastructure, technical assistance, time constraints, and training. The survey also revealed a lack of ICT skills in teachers, a lack of teachers' confidence in using ICT resources, a lack of training, the absence of appropriate educational programs, teachers and students' limited access to ICT, rigid traditional education systems, constrictive curricula, and other problems.

The teachers were also asked to rate college's equipment readiness. The scale used is as follows: Strongly disagree (1), disagree (2), agree (3) and strongly agree (4). Results are captured in Table 2.

Table: 2 College's ICT Equipment Readiness

Statement	Strongly disagree		Disagree		Agree		Strongly agree		Mean	SD
	f	%	f	%	f	%	f	%		
My college has different ICT resources such as GIS CD-ROM drives that work well for teaching Geography.	2	33.3%	3	50.0%	0	0.0%	1	16.7%	1.8	0.8
In my opinion, the college has printers that work well.	0	0.0%	0	0.0%	4	66.7%	2	33.3%	3.7	0.5
My college has stable electricity (12hours) for ICT utilization	2	33.3%	4	66.7%	0	0.0%	0	0.0%	1.7	0.5
My college has computer projectors and screens that work well.	1	16.7%	4	66.7%	1	16.7%	0	0.0%	2.2	1.0

The study found that teachers agreed that the college has printers that work well, but there was high disagreement about the quality of ICT resources such as GIS CD-ROM drives, stable electricity (12 hours), computers, projectors, and screens. The results indicate that the college lacks equipment readiness to support ICT use for geography instruction. Efficient utilization of ICT resources in teaching and learning geography requires a stable electricity supply and internet connectivity. This negatively impacts students' performance in geography, as they cannot independently investigate and acquire fundamental geographical abilities. College administrators must work closely with stakeholders to ensure 24-hour power supply and internet connectivity to complement instructors and students while learning geography with ICT resources. The study aligns with Rana and Rana's (2020) findings, which revealed the main obstacles to successfully integrating information communication and technology into teacher education, including limited university investment in ICT infrastructure, professional development of teaching and non-teaching staff, unstable electricity, and minimal administrative support for effective use of available ICT resources during instruction. Inadequate internet access also restricted access to digital information.

Table: 3 Geography Instructors' ICT or Literacy Skills and readiness

Statement	Strongly disagree		Disagree		Agree		Strongly agree		Mean	SD
	f	%	f	%	f	%	f	%		

I have enough technical skills to use ICT in Teaching Geography in the college.	0	0.0%	4	66.7%	1	16.7%	1	16.7%	2.5	0.8
To access the internet is not a problem to me.	0	0.0%	0	0.0%	3	50.0%	3	50.0%	3.5	0.5
I have the basic technical knowledge to fix technical e-learning problems.	2	33.3%	2	33.3%	1	16.7%	1	16.7%	2.2	1.2
I have enough technical competencies to prepare ICT resources in Teaching Geography in the college.	0	0.0%	3	50.0%	2	33.3%	1	16.7%	2.8	1.0
I know information Communication and technology (ICT).	1	16.7%	0	0.0%	3	50.0%	2	33.3%	3.2	1.2
I am fully aware of how to use ICT and GIS in the classroom.	0	0.0%	4	66.7%	2	33.3%	0	0.0%	2.7	1.0
It is easy to acquire the skills to use ICT in teaching and learning geography.	0	0.0%	1	16.7%	4	66.7%	1	16.7%	3.5	0.8
I am prepared to use and incorporate ICT in teaching geography in college.	0	0.0%	3	50.0%	2	33.3%	1	16.7%	2.8	1.0

The study found that most instructors (50.0% agree and 50.0% strongly agree) have basic ICT skills and knowledge relevant to geography teaching. However, the majority (66.7%) disagree with the statement of having enough technical skills to use ICT in teaching, while 16.7% agree and strongly agree. This indicates that instructors lack the technical skills to use ICT in teaching geography, which negatively influences students' achievement. College administrators must work with the government, partners, and other educational stakeholders to fill in these gaps, as the use of ICT resources in teaching geography and other subjects might not be possible soon. The country might not have a desirable workforce with the necessary skills of the 21st century. The study also agreed with a study by Pearl Villalon Tomaro (2018), which identified difficulties that endanger the value of technical training among Filipino students. These difficulties include infrastructure and facilities, human resources, and the need for a technological leader. The Philippines' schools lack the right infrastructure and computer technology for teaching, while Nepal's teacher education faces challenges in integrating ICT resources in higher education due to poor policies, unskilled employees, insufficient ICT training for lecturers and professors, and inconsistent electrical supply. Low ICT skills hinder the integration of digital technology and the development of trained instructors, preventing the modernization of Nepal's education system.

Table: 4 Instructors Self-assessments on ICT or Digital Literacy Skills

	Poor		Adequate		Good		Excellent	
	f	%	f	%	f	%	f	%
Computer literacy skills	0	0.0%	4	66.7%	2	33.3%	0	0.0%
Internet literacy skills	0	0.0%	5	83.3%	1	16.7%	0	0.0%
GIS skills	5	83.3%	1	16.7%	0	0.0%	0	0.0%
Typing speed	1	16.7%	3	50.0%	2	33.3%	0	0.0%

This study aimed to assess the ICT skills of geography instructors, focusing on their preparedness for ICT resources and providing recommendations. The results showed that 66.7% of instructors rated their computer literacy skills as adequate, while 33.3% rated them as good. 83.3% rated their internet literacy skills as adequate, while 16.7% cited them as good. 83.3% rated their GIS skills poor, and 16.7% rated them adequate. Additionally, 50.0% rated their typing skills as adequate, 33.3% as good, and 16.7% as poor. These digital literacy skill gaps could hinder the use of ICT in geography instruction, negatively affecting students' performance. The study supports Antwi et al.'s (2018) findings that insufficient use of new digital technologies during geography instruction is due to instructors' limited ICT skills. Additionally, Ridha

and Kamil's (2021) study found that a lack of learning facilities, teacher training, ICT infrastructure, and GIS software in computer laboratories hinders the application of geospatial technology.

ICT resources from Instructors' Interview schedule
The teachers were asked to comment on whether the institution had the appropriate ICT resources to teach geography. According to the respondents, the college lacks the ICT resources needed for a comprehensive application of ICT in geography instruction. The institution's geography department has a few challenges that make it difficult to employ ICT resources to teach and learn geography. These difficulties include a lack of an ICT resource center, a lack of electricity, a lack of an ICT policy framework, a paucity of relevant ICT resources necessary for geography instruction, and poor internet access.

Three instructors remarked:
> *No, the institution lacks some of the information and communication technology (ICT) resources essential to teach geography in the twenty-first century. Furthermore, that college lacks an ICT resource center or lab, which would aid in the completion of the subject's teaching and learning. As a result, we geography instructors are doing our best to navigate the resources that are currently available (such as Google Maps, YouTube, Google Meet, a projector, computer, tablet, smart phone, and so on) to make the teaching and learning activities motivating and to get our students fully involved and engaged in the learning process.*

Five instructors remarked:
> *Some of the ICT tools essential for geography teaching and learning are lacking at the college. a lack of adequate internet services, a lack of ICT materials relevant to geography instruction, and a lack of an ICT policy framework. Currently, the college has weak internet connectivity, a malfunctioning projector, and inoperative desktop computers. The majority of educators who use modest ICT tools during instruction must use their own devices and provide their own internet access. Furthermore, geography professors and students are not permitted to utilize the mini computer lab since it is used for other purposes and neither instructors nor students are permitted to use it.*

Six of the instructors remarked:
> *Most of us are not ICT or digitally literate, and there is no ICT professional development in the college for geography instructors, which is limiting some of us from utilizing the available ICT resources in the college even though they are not that relevant for teaching and learning geography. Most of us have the passion to embrace this new development in education; however, limited knowledge and skills, insufficient relevant ICT resources, a shortage of electric power supply, a lack of internet connectivity, a lack of an ICT lab, and a lack of ICT resources are limiting our ability to fully utilize ICT in the teaching and learning of geography.*

Classroom Observation Checklist
The Classroom Observation Checklist evaluated ICT resources used by geography instructors, instructor qualifications, knowledge, and expertise, student resources, teaching organization, student methods and strategies, and student performance in classroom exercises. It also assesses students' use of resources, geography instructors' teaching strategies, and overall student performance.

The knowledge and skills Instructor possess for ICT utilization during geography instruction are summarized in Table: 5

Table: 5 Knowledge and skills Instructor possess for ICT utilization during geography instruction

	Yes	No
Basic Computer Skills	2	4
Content Knowledge	6	0
Pedagogy knowledge	6	0
Technological Knowledge	2	4
Internet Navigation Skills	3	3
Networking Skills	3	3

Classroom management Skills	6	0
Presentation Skills	5	1

The findings indicate that most instructors possess content knowledge, pedagogy knowledge, classroom management skills, presentation skills, and a few possess technological knowledge, internet navigation skills, networking skills, and basic computer skills, which indicate that there are serious ICT knowledge and skill gaps that need attention if and only if ICT utilization in geography instruction needs to be a reality for students' geography achievement. This finding illustrates that these geography instructors' knowledge and skill gaps have a negative influence on students' geography performance. In conjunction with this argument, there is a need for an instructors' professional development program in the college that will help instructors acquire the relevant ICT knowledge and skills that are very necessary for ICT integration and utilization in the teaching and learning of geography. The findings are in agreement with Ghavifekr et al., (2015) study results, which indicated that ICT integration has great effectiveness for both teachers and students. Findings indicate that teachers' well-equipped preparation with ICT tools and facilities is one of the main factors in the success of technology-based teaching and learning. It was also found that professional development training programs for teachers also played a key role in enhancing students' quality learning. For future studies, there is a need for consideration of other aspects of ICT integration, especially from a management point of view with regard to strategic planning and policy making.

Further, the researcher observed the way ICT resources are used by students during geography instruction and the results are reported in Table 6.

The instructors were asked to specify challenges faced while using ICT in teaching Geography. Based on the feedback, the following challenges were fronted by the instructors:

Table:6 Challenges of using ICT in teaching Geography

Challenges	Percent
Shortage of electricity	68%
Lack of effective internet service or facility	70%
Lack of ICT resources for geography instruction in the college	59%
Lack of adequate budget to support geography department	79%
Lack of regular ICT skills training	72%
Lack of ICT program in the curriculum	66%

According to the findings, the challenges can be ranked as follows: Lack of adequate budget to support the geography department; lack of regular ICT skills training; lack of effective internet service or facility; shortage of electricity; lack of an ICT program in the curriculum; and lack of ICT resources for geography instruction in the college. The findings imply that teachers experience numerous challenges while using ICT in teaching Geography.

The findings are consistent with the work of Kennedy (2020), who identified the non-existence of ICT's infrastructure and other equipment, such as computers, software, institutional internet facilities, and projectors, as major challenges impeding ICT incorporation in teachers' education, as well as a lack of support for teachers, insufficient experience teaching with ICT, and insufficient ICT training. Further, Igbunu (2022) revealed that the absence of consistent power constitutes a significant barrier that has hampered the expansion and development of the nation's economy.

The instructors were further asked to provide suggestions about ways to solve these difficulties. The recommendations are summarized shown in Table 7.

Table: 7 Instructors' suggestions on how to address ICT challenges

| Suggestions	Percent
Establish an equipped ICT resources centre or lab in the college	89%

Provide internet services for staff and the students	72%
Develop comprehensive ICT policy framework that will help in promoting the use of ICT	75%
The college should conduct regular ICT workshop or training for all staff and the students	69%
Stable electric power in the college	78%

Based on the findings, the instructors recommended the need to establish an equipped ICT resources center or lab in the college, internet services for staff and students, and a comprehensive ICT policy framework that will help in promoting the use of ICT. Additionally, the college should conduct regular ICT workshops or training for all staff and students, and there should be stable electric power in the college.

Challenges experienced while utilizing ICT resources during geography instructions from Instructors' interview schedule

The instructors were asked to state difficulties faced while using ICT to teach geography. Based on the findings, several difficulties were identified in figure 1 as follows:

Figure:2 Challenges experience by geography instructors during instruction
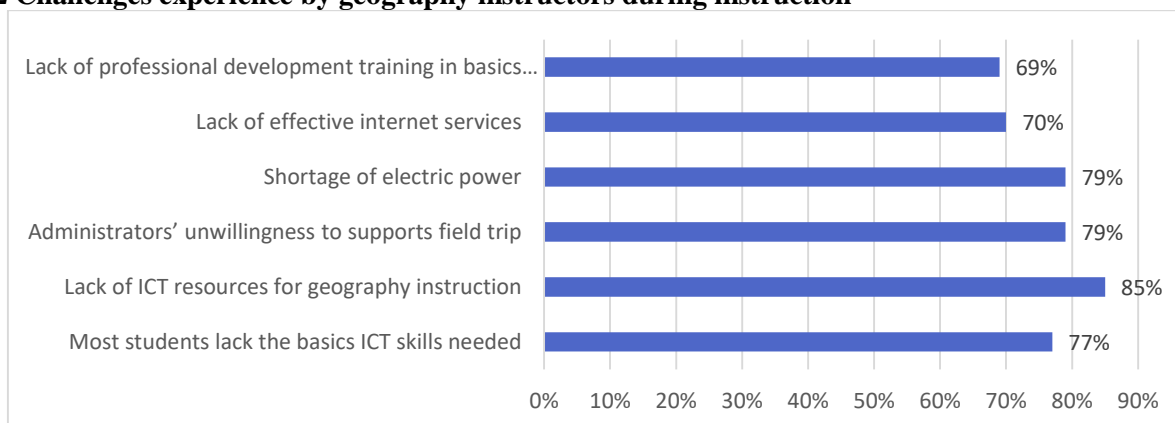
Based on the findings, the challenges can be ranked as follows: Lack of ICT resources for geography instruction, administrators' unwillingness to support field trips, due to a shortage of electric power, most students lack the basic ICT skills needed, lack effective internet services, and lack of professional development training in the basics of ICT skills. The findings reveal that instructors face many challenges when using ICT resources to teach geography.

The results are similar to those of Ridha and Kamil (2021), who highlighted a lack of learning facilities, teacher training, ICT infrastructure, and GIS software in computer laboratories as obstacles to the application of geospatial technology. Similarly, Rajan (2018) observed that the most critical challenges include poor network connectivity, a lack of reliable energy, self-motivation, the need for extra time, the encouragement for instructors and students to incorporate ICT tools during instructions, and the difficulty of applying ICT software while teaching and learning. Additionally, the findings concur with Behera (2022) results that lack of ICT proficiency, teacher insecurity, pedagogical teacher preparation, and new student follow-up are among the issues at the teaching level.

Challenges experienced while utilizing ICT resources during geography instructions from College's administrators' interview schedule

Table: 8 Challenges when using ICT resources to teach geography

Challenges	Frequency	Percentage (%)
Inadequacy of ICT resources for geography instruction	6	85.7
Limited knowledge of faculty about the available ICT resources	5	71.4
Lack of stable electricity,	5	71.4
Lack of institutional internet	6	85.7

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Lack of ICT skills training for faculty	5	71.4
Lack of support for faculty	4	57.1

The college administrators were asked to discuss the issues the college is having with ICT utilization and how much geography faculty use ICT resources in their teaching and learning activities. The responders elaborated on a number of important issues using ICT resources. As 6 (85.7%) mentioned the inadequacy of ICT resources for geography instruction, 5 (71.4%) mentioned faculty's limited knowledge of available ICT resources and devices, 5 (71.4%) mentioned a lack of stable electricity, 6 (85.7%) mentioned a lack of institutional internet, 5 (71.4%) stated a lack of ICT skills training for faculty, and 4 (57.1%) mentioned a lack of faculty support. Because of these multiple hurdles, most geography instructors are hesitant to integrate ICT in their classrooms. The results unmistakably show that there are ICT utilization gaps during college geography instruction that demand immediate attention from the appropriate authorities; otherwise, Liberia will lag further behind in digitalizing its educational system and fall short of achieving Sustainable Development Goal 4 of the Vision 2030 agenda. The results of this study agree with Ghavifekr et al., (2016) study, which stated the key issues and challenges found to be significant in using ICT tools by teachers were limited accessibility and network connection, limited technical support, a lack of effective training, limited time, and a lack of teachers' competency. This is also in conjunction with Omwenga and Meremo (2019). The major challenges faced by instructors that might have contributed to the limited use of ICT included computer breakdowns, inadequate staff training, limited computer hardware and software, and administrative tasks.

Administrators' suggestions on how to address ICT challenges from the college's administrators' interview schedule
The college administrators were asked to provide suggestions on how the challenges the college faced in terms of ICT utilization in the teaching and learning of geography could be mitigated. The seven (7) administrators out of the 10 administrators sampled who participated revealed that the only way ICT can be fully integrated and utilized in the college is by collaborating with the government, with the help of its partners, in establishing an ICT resource center in the college, providing relevant ICT resources that are needed for teaching all subjects, and providing a stable internet connection and electricity. The college should have a monitoring arm to make sure that ICT resources are proactively used. Lastly, the government should provide ICT resources (laptops, smart phones, and tablets) to all of the teachers in training. On the other hand, the administrators should provide professional development training for all her instructors or lecturers at least once or twice every semester.

7. CONCLUSION :
The difficulties faced by geography instructors in the college include the infrastructure readiness of the college to support geography instructors, the readiness of the college's ICT equipment, instructors' ICT or digital literacy skills, the lack of an ICT or digital literacy professional development program for geography, the lack of funding, the lack of pertinent ICT resources for geography teaching and learning, and poor internet services. If the issues raised in this study are not resolved, professional experience and numerous studies have demonstrated that the integration and utilization of ICT resources in geography teaching and learning will never be feasible. Additionally, these difficulties have a detrimental impact on geography teaching and learning effectiveness and have contributed to Liberian students' subpar geographic achievement. Additionally, instructors have been able to teach geography as an abstract subject due to the limited or non-existent use of ICT resources and field trips. This prevents students from developing the critical thinking, inventiveness, problem-solving, and other pertinent skills that are crucial for the workforce in the 21st century. In order to mitigate these challenges, the national government must work together with important educational stakeholders and partnering organizations in the field of education. Additionally, geography instructors and the college's administrators further suggested the following:

Geography instructors' suggestion: Based on the findings, the instructors proposed that the college construct an equipped ICT resources centre or lab, internet services for staff and students, and a complete ICT policy framework to aid in the promotion of ICT use. Furthermore, the institution should hold regular ICT seminars or training for all staff; there should be a special budget allocated for geography instructors to conduct field trips with students; and the college should have reliable electricity and effective internet connectivity for all.

College's administrators' suggestion: College administrators were asked to suggest ways to mitigate challenges in ICT utilization in geography teaching and learning. Seven administrators suggested collaborating with the government

and partners to establish an ICT resource centre, provide necessary resources, and ensure stable internet and electricity. A monitoring arm should be in place to ensure proactively using ICT resources. The government should provide ICT resources to teachers in training, while administrators should provide professional development training for instructors or lecturers at least once or twice per semester.

8. RECOMMENDATIONS:

Using ICT resources is critical to teaching and learning geography in the 21st century, as mandated by educational changes globally. However, there are some barriers that may prohibit its utilization. Examples include a lack of appropriate ICT resources, instructors and students lacking basic ICT skills, unstable electricity, a lack of internet infrastructure for both students and instructors, nonexistence of an ICT resource centre, a lack of relevant ICT resources for teaching and learning of geography, the absence of an appropriate ICT integration policy and curriculum that supports its implementations, a lack of ICT resources, a lack of ICT professional development training for geography instructors, and a lack of other critical resources and contributions that are very significant to the successful utilization of ICT in teaching and learning of geography. In consideration of this, college administrators, the government through the Ministry of Education, and other educational partners should collaborate to address these issues revealed by this study that prevent the use of ICT in the college from successfully achieving SDG Goal 4, which refers to high-quality education in the twenty-first century.

REFERENCES:
1. Adarkwah , M. A. (2021). An Outbreak of Online Learning in the COVID-19 Outbreak in SubSaharan Africa: Prospects and Challenges. *Global Journal of Computer Science and Technology: H Information & Technology, 21*(2), 1–10. Global Journals.
2. Agyei, D. D. (2021). Integrating ICT into schools in Sub-Saharan Africa: from teachers' capacity building to classroom implementation. *Education and Information Technologies*. https://doi.org/10.1007/s10639-020-10253-w
3. Al-Mamary, Y. H. S. (2020). Examining the factors affecting the use of ICT in teaching in Yemeni schools. *Journal of Public Affairs*. https://doi.org/10.1002/pa.2330
4. Antwi, S., Bansah, A. K., & Franklin, T. (2018). The Information Technology Challenge in Teaching Senior High School Geography in Ghana. *Issues and Trends in Learning Technologies*, *6*(1). https://doi.org/10.2458/azu_itet_v6i1_antwi
5. Asamoah, R., Asiedu, N. K., & Buadi, D. W. (2022). Use of ICT in Teaching and Learning in Second Cycle Institutions: Understanding The Technological Aspect of the Tpack Model. *UDS International Journal of Development*, *9*(1), 737–748. https://doi.org/10.47740/537.udsijd6i
6. Bariu, T. N. (2020). Status of ICT Infrastructure Used in Teaching and Learning in Secondary Schools in Meru County, Kenya. *European Journal of Interactive Multimedia and Education*, *1*(1), e02002. https://doi.org/10.30935/ejimed/8283
7. Basaran , B., & Yalman , M. (2022). Determining the perceptions of pre-service teachers on technology-based learning during the Covid-19 process: a latent class analysis approach. *Education and Information Technologies*. https://doi.org/10.1007/s10639-022-10910-2
8. Behera, R. (2022). Factors Affecting Integration of ICT in Secondary Education-A Case Study. *Scholarly Research Journal for Humanity Science & English Language*, *10*(50), 12464–12472. Google Scholar. https://doi.org/2348-3083
9. Chirwa, C., & Mubita, K. (2021). The use of ICT in teaching of Geography in selected schools of Petauke district in eastern province of Zambia. *International Journal of Research and Innovation in Social Science (IJRISS)*, *V*(X). ResearchGate. https://doi.org/https://www.researchgate.net/publication/355782295
10. Ghavifekr, S., Kunjappan, T., Ramasamy , L., & Anthony , A. (2016). Teaching and Learning with ICT Tools: Issues and Challenges from Teachers' Perceptions . *Malaysian Online Journal of Educational Technology*, *4*(2), 38–57.
11. Ghavifekr, S., Kunjappan, T., Ramasamy, L., & Anthony, A. (2015). Teaching and learning with ICT tools: Issues and challenges from teachers' perceptions. *Malaysian Online Journal of Educational Technology*, *4*(2). https://files.eric.ed.gov/fulltext/EJ1096028.pdf
12. Ghavifekr, S., Kunjappan, T., Ramasamy, L., & Anthony, A. (2023). Teaching and Learning with ICT Tools: Issues and Challenges from Teachers' Perceptions. *Malaysian Online Journal of Educational Technology, 4*(2), 38–57. Google scholar.
13. Gulbahar , Y., & Guven , I. (2008). A Survey on ICT Usage and the Perceptions of Social Studies Teachers in Turkey. *Education Technology and Society*, *11*(3), 37–51.
14. Habibu, T., Clement, C. K., & Al Mamun, M. A. (2012). Difficulties Faced by Teachers in Using ICT in Teaching-Learning at Technical and Higher Educational Institutions of Uganda. *International Journal of Engineering Research & Technology (IJERT)*, *1*(7), 1–9. ResearchGate.
15. Hlatywayo, J., & Manik, S. (2022). Teaching Geographic Information Systems (GIS) in South African High Schools in the Frances Baard District. *Universal Journal of Educational Research*, *10*(5), 334–348. https://doi.org/10.13189/ujer.2022.100503

16. ICTE Solutions Australia Teaching Resources. (2021). *Go beyond just integrating technology in classrooms...develop ICT capability.* M.facebook.com. https://m.facebook.com/p/ICTE-Solutions-Australia-Teaching-Resources-100063584183989/

17. Igbunu, R. O. (2022). Impacts of ICT Integration in Computing Science Education in The Nigerian Educational System. *Mosogar Journal of Science Education*, 9(1), 137–146. https://mojose.net/index.php/journal/article/view/19

18. Kadhim, A. J. (2020, January 1). *Effective Use of ICT for Learning and Teaching Geography/ORCID*. Orcid.org; ResearchGate. http://orcid.org/0000-0002-1333-6377

19. Karakostantaki, E., & Stavrianos, K. (2021). The use of ICT in teaching religious education in primary school. *Education and Information Technologies*. https://doi.org/10.1007/s10639-020-10417-8

20. Kennedy, G. M. (2020, April). *Challenges of ICT Integration in Teachers' Education: A Case Study of the William V.S. Tubman Teachers College, University of Liberia*.

21. Kennedy, G. M. (2023). Challenges of ICT Integration in Teachers' Education: A Case Study of the College of Education, University of Liberia. *International Journal of Social Science and Education Research Studies, 03*(05). https://doi.org/10.55677/ijssers/v03i5y2023-15

22. Koehler, M. J., Mishra, P., Akcaoglu, M., & Rosenberg, J. M. (2013). *The Technological Pedagogical Content Knowledge Framework for Teachers and Teacher Educators/Creative Commons — Attribution-ShareAlike 3.0 Unported — CC BY-SA 3.0*. Creativecommons.org. http://creativecommons.org/licenses/by-sa/3.0/

23. Kujeke, E. C., Thomas, K. A., & Nyaruwata. (2017). An Analysis of the Predictive Relationship of ICT Challenges and Work Motivation of Lecturers to Overall ICT Integration in Universities in Harare , Zimbabwe. *International Journal of Science and Research (IJSR)* , 770–780. https://doi.org/10.21275/ART2017798

24. Lidström, H., & Hemmingsson, H. (2014). Benefits of the use of ICT in school activities by students with motor, speech, visual, and hearing impairment: A literature review. *Scandinavian Journal of Occupational Therapy*, *21*(4), 251–266. https://doi.org/10.3109/11038128.2014.880940

25. Mensah, B., Poku, A. A., & Quashigah, A. Y. (2021). Technology Integration into the Teaching and Learning of Geography in Senior High Schools in Ghana: A TPACK Assessment. *Social Education Research*, *3*(1), 80–90. https://doi.org/10.37256/ser.3120221218

26. Mhishi, M., Chimbwanda, V. M., & Gwizangwe, I. (2023). Embracing the new normal: Geography teachers' preparedness and the use of e-learning methodologies. *Pedagogical Research*, *8*(1), em0147. https://doi.org/10.29333/pr/12665

27. Omwenga, E. N., & Meremo, J. (2019). Challenges Facing Administrators in the use of ICT in Kuria District Secondary Schools in Kenya. *Journal of Research Innovation and Implications in Education*, *3*(1). ResearchGate.

28. Pearl Villalon Tomaro, Q. (2018). ICT integration in the educational system of Philippines. *Journal of Governance and Public Policy*, *5*(3). https://doi.org/10.18196/jgpp.5399

29. Rahayu, S., Rahmadani, E., Syafitri, E., Prasetyoningsih, L. S. A., Ubaidillah, M. F., & Tavakoli, M. (2022). Teaching with Technology during COVID-19 Pandemic: An Interview Study with Teachers in Indonesia. *Education Research International*, *2022*, 1–9. https://doi.org/10.1155/2022/7853310

30. Rajan, R. (2018, August). *(PDF) Factors Influencing the Effective use of ICT in Education and Learning – Indian Perspective*. ResearchGate. https://www.researchgate.net/publication/327644939_Factors_Influencing_the_Effective_use_of_ICT_in_Education_and_Learning_-_Indian_Perspective

31. Rana, K., & Rana, K. (2020). ICT Integration in Teaching and Learning Activities in Higher Education: A Case Study of Nepal's Teacher Education. *Malaysian Online Journal of Educational Technology*, *8*(1), 36–47. https://doi.org/10.17220/mojet.2020.01.003

32. Ridha, S., & Kamil, P. A. (2021). The Problems of Teaching Geospatial Technology in Developing Countries: Concepts, Curriculum, and Implementation in Indonesia. *Journal of Geography*, *120*(2), 72–82. https://doi.org/10.1080/00221341.2021.1872681

33. Sofi-Karim, M., Bali, A. O., & Rached, K. (2022). Online education via media platforms and applications as an innovative teaching method. *Education and Information Technologies*. https://doi.org/10.1007/s10639-022-11188-0

34. Teaching Times. (2022). *ICT in Geography/How can ICT be used most effectively to teach geography?* Teaching Times. https://www.teachingtimes.com/knowledge-banks/ict-in-geography/

35. UNESCO. (2023, April 21). *Scaling up digital learning and skills in the world's most populous countries to drive education recovery | UNESCO*. Www.unesco.org. https://www.unesco.org/en/articles/scaling-digital-learning-and-skills-worlds-most-populous-countries-drive-education-recovery