UNIVERSITY OF CAPE COAST

ASSESSMENT OF HISTORY INSTRUCTORS' TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE IN THE SENIOR HIGH SCHOOLS OF MONTSERRADO COUNTY EDUCATIONAL DISTRICT 1B, LIBERIA

KIAZAH MOLLY SHERMAN

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BY

KIAZAH MOLLY SHERMAN

Thesis Submitted to the Department of Arts Education, Faculty of Humanities and Social Sciences Education, College of Education Studies, University of Cape Coast, in Partial Fulfillment of the Requirements for the Award of Master of Philosophy Degree in Arts Education, (History).

JULY 2024

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature……. Date…….

Name: Kiazah Molly Sherman

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised by the guidelines on supervision of the thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature…… Date…….

Name: Prof. Charles Adabo Oppong

Co-Supervisor's Signature……. Date…….

Name: Dr. Edmond K. Agormedah

ABSTRACT

This research was designed to assess the Technological Pedagogical Content Knowledge of secondary school History instructors in Montserrado County Educational District 1B, Liberia. A descriptive cross-sectional survey design of the quantitative research approach was employed in conducting this study. This research encompassed all 85 History instructors currently teaching in Montserrado County Educational District 1B senior high schools. A census survey approach was employed to involve all the participants. The primary tool utilized for soliciting responses from the respondents was a questionnaire. Descriptive statistics was used to analyse the gathered data, such as means, percentage, standard deviation, and inferential statistics, including One-way Factorial ANOVA and Independent Sample t-tests. Results from the study indicate that History instructors have moderate level of technological knowledge, technological pedagogical knowledge, technological content knowledge, and technological pedagogical content knowledge. Additionally, the findings show no statistical differences in History instructors' Technological Pedagogical, and Content Knowledge levels based on gender and qualification. The findings also revealed statistical differences in History instructors' Technological Pedagogical, and Content Knowledge levels based on age and teaching experience. It is recommended that History instructor education institutions endeavour to include the Technological Pedagogical Content Knowledge (TPACK) curriculum in their training programm documents.

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Furthermore, my appreciation to Dr. Cecelia Cassell, the Dean of the Williams V.S. Tubman College of Education, and Mr. Abraham Kiazolu (IRISE Project Coordinator), for the support and opportunities provided me during my studies.

DEDICATION

To my beautiful wife, Mrs. Jennifer Sherman, and kids Melissa, Divine, and Keziah Sherman

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CHAPTER ONE

INTRODUCTION

In 21st-century education, the advancement of computer technology requires continuous engagement between teachers, students, and educational technology. This imposes a huge burden on teachers to have the necessary 21st-century skills and understanding that may support them in incorporating digital technology, pedagogy, and content into instructions. However, according to Clark (2013), the literature does not seem to support the notion that instructors in Montserrado County Educational District 1B, Liberia have the necessary technological, and pedagogical content knowledge to augment their instruction by utilizing digital technology. Due to the aforementioned, assessing history instructors' technological pedagogical content knowledge in Montserrado County Educational District 1B senior high schools regarding History as an academic discipline is expedient and significant.

Background of the Study

The fast rise and growth of digital technology have significantly altered how people work, live, and behave (Alshehri, 2012), and one cannot overstate its importance in education today. Additionally, it has had an incredible influence on how education is delivered. According to Kennedy (2020), UNESCO in 2019 placed an even greater emphasis on the useful benefits that ICT brings to instruction and learning, citing its ability to widen participation in the classroom, facilitate collaboration among educators, raise the bar for educational quality, promote greater social inclusion, and enhance management. However, despite

several projections regarding technology's potential in education, the vision is yet to be fulfilled, and its integration within the educational sector seems to be a key impediment to teachers (Lawrence, & Tar, 2018).

There have been many initiatives to help with the integration of technology in educational settings (Bring Your Own Devices, Leave No Child Behind) for students to have access to technology during learning and policies (The 2010 National Education Technology Plan of America and Ghana ICT4AD Policy, 2003) have all been initiated as well as for training programmes meant for the preparation of instructors during their professional development. Moreover, several studies, such as the ones conducted by Nakayima (2011), and Jamieson - Proctor et al.., (2013) have shown that incorporating technology into instructions can increase the achievement of pupils (Ghavifekr, & Rosdy, 2015). Using digital tools by students will also enable them to acquire learning experiences as specialists do in a real-life environment. Also, it will aid in the advancement of 21st-century qualifications and competencies such as "critical evaluation, difficult resolution of issues, working together, and digital media exchanges of information"(Matherson, Wilson, & Wright, 2014).

Given the rising prominence of ICT in the educational setting, it is now more important than ever that instructors be fully versed in the skills and knowledge necessary to use it successfully (Mishra & Koehler, 2003, Twining, Raffaghelli, Albion, & Knezek, 2013). Incorporating Edu-Tech into educational settings cannot be ensured only by the technological abilities of instructors (Ertmer, 2003 Bhattacharyya, Walke, & Shah, 2022). The link between instruction

and learning with technology utilization may be considered interactional and dynamic (Bruce, 1997; Koehler, Mishra, Hershey, & Peruski, 2004). When attempting to incorporate ICT in a teaching environment properly, it is necessary to have an in-depth grasp of the subject matter, instructional strategies, and technology, and how these components interact (Mishra & Koehler, 2006; Zhao & Frank, 2003). Matherson, Wilson, and Wright, (2014) also corroborated this assertion by stating that, the teacher must gain an in-depth comprehension of every separate part of the Technological Pedagogical Content Knowledge Model subject matter, instructional strategies, and technology, for meaningful technological integration to occur.

The National Education Technology Plan, according to Culatta (2016), emphasized that several programmes instituted for professional development for training teachers lack the instructional programmes required for the efficient usage of technology by teachers. Many instructors in the U.S.A. and other nations globally are still unaware of the benefits of using technology during instruction, claims Niess (2010). This was also affirmed by Gray, Thomas, and Lewis and the National Centre for Education Statistics as cited by Alshehri (2012), that just 25% of basic and secondary school instructors in public schools in the U.S.A. felt their bachelor programmes for teacher preparation prepared them to incorporate Edu-tech into their classroom instruction successfully.

Similar situations to the United States of America and some countries globally exist in Sub-Saharan Africa. According to Wallet (2015), the UNESCO Institute of Statistics (2015), states that in most nations in Sub-Saharan Africa,

ICT usage in education is still in its infancy. Moreover, it further states that although ICT is being integrated into education in the majority of these nations, even though at varying rates, growth is still sluggish since there are not enough effective regulations, equipment with basic infrastructure (such as energy, the internet, or gadgets), funds, or teachers with the necessary skills. For instance, a study conducted in Ghana by Hordzi, Mereku, Tete-Mensah, Williams, and Yidana as cited in Apau (2016), confirms that training programmes at universities and colleges provide minimum opportunities for educating future instructors with the understanding and expertise that are applicable and essential for integrating technology during instruction.

Furthermore, Ajanma (2016) revealed that integrating Edu-tech within Nigeria's secondary schools has not been embraced. Thereby; making chalkboards as well as textbook utilization to control the instructional process. He further consented with the UNESCO Institute of Statistics' assertions, that the lack of equipment with basic infrastructure is pivotal to the challenges that schools face in integrating technology in countries in Sub-Saharan Africa by emphasising for instance, that an urban secondary school in Nigeria with an enrolment of 510 students and 45 teaching and administrative staff have only 45 computers to be used in the school. Additionally, Ajanma (2016), revealed that the steady decline in the incorporation of technology into senior high schools in Nigeria is solely due to a lack of infrastructure, cost, connectivity, and competence of teachers.

Similarly, according to Kennedy (2020), digitisation in Liberia continues to advance in some sectors, but the country still has problems integrating

technology into its educational system. He also posits that the Ministry of Education is not making sufficient strides in incorporating technology into the curriculum and instructional process from which History instruction is no exception. In addition, many private institutions and public secondary schools lack libraries and facilities that can provide history students with the necessary hands-on details, for improving their learning. Bernard (2004) also asserts that secondary school instructors' deficiency in knowledge, skills, and abilities in utilising digital resources is due to the absence of digital training skills programmes within teachers' training curricula at training colleges and universities level.

Liberia is a country striving to recover from the effects of devastating civil turmoil, and the Ebola epidemic. The COVID-19 Pandemic has resulted in massive economic and social ruin for the country, and ICT infrastructures are no exception. However, the national government crafted an ICT Policy in 2019 to make Liberia competitive in the region by establishing an inclusive information society that supports social, economic, political, environmental, and cultural development. The vision of this policy is to support the development of human capital, emphasizing offering ICT programme specialisation. Additionally, the policy seeks to build a robust infrastructure that supports increased connectivity, attracts investment, and fosters employment opportunities.

History is a basic core subject in the Liberian school curriculum. Hence, its instructions must encourage instructors to be creative and open to contemporary facts from their region or the global community (Barrios-Tao,

Siciliani-Barraza, & Bonilla-Barrios, 2017). To qualify students to become internationally competitive, History teachers must serve as major agents for societal changes by incorporating technology in their instructional approaches and during instruction. According to Kereluik, Mishra, and Koehler, (2010), History instructors must have the mindset that there is always growth potential when selecting instructional methodologies and relevant technology during the instruction of course contents in a multi-faceted dimension.

Additionally, History is a source of stability and maturity that can help people build self-worth and maturity (Silva, 2016). People will eventually lose sight of their responsibility if History is not taught properly (Ayot, 1979). He further argues that without knowledge of History, people will be unable to understand who they are and what they have become. This is why History instructors need to be up to date on world events and this can be accomplished by developing effective courses and managing modern technology. We must give "History" the reverence it deserves in the classroom while adhering to contemporary educational trends to produce sophisticated and proficient citizens. Children can develop into competent students, self-assured people, responsible citizens, and helpful members of society at a time when countries compete for better results and more cutting-edge accomplishments through studying History.

Finally, History also serves as the foundation for developing people into the kind of knowledgeable, engaged, and thoughtful citizens who will affect the future and welfare of their communities on all scales (Banks, et al, 2005). Learning History not only assists students but also helps promote critical thinking

abilities and creativity in the learners (Oppong, 2009; Van Boxtel, & Van Drie, 2013). Taking into consideration the relevance of History in the context of its significance, i.e., to generate people who are critical thinkers, patriotic, morally driven, nationalistic, and knowledgeable, (Collins & Stearns, 2020; Oppong, 2012; Van Drie, 2013), weightiness must be given its instructions and learning as well as formulating its instructional curriculum in line with the newest educational trends. When instructors are grounded in the lessons taught during History instructions, it is often accepted as a given that they will be able to impart that knowledge to their learners.

Theoretically, the TPACK (technological and pedagogical content knowledge) paradigm is proffered as an approach in the twenty-first century to comprehend instructors' knowledge essential for successful technology incorporation (Mishra & Koehler, 2006). The model illustrates what instructors must understand about technology and how to create engaging lessons and activities that combine technological expertise with instructional expertise and subject-matter expertise to give learners the best possible experience. Creating effective content, according to the TPACK paradigm necessitates a deliberate integration among the three fundamental knowledge groups: instructional methodologies, technology, and subject matter. The combination of pedagogical knowledge and content knowledge by instructors develops or culminates in pedagogical content knowledge, whereas, the accumulation of technology to their Pedagogical Content Knowledge, leads to the establishment of TPCK, resulting in a teaching space where students and instructors are thoroughly involved in and

directly with anyone's learning. Within the realm of teacher education, TPACK has surfaced as a prevalent reference conceptual framework. It is responsible for establishing a common ground for the discussion of the incorporation of technology into educational settings, and it views educators as the gatekeepers of the curriculum (Thronton, 2001).

Several research (Lin, Tsai, Chai & Lee, 2013; Jang & Tsai, 2012; Anthony, Subali, Pradana, Hapsari & Astuli, 2019; Gomez-Trigueros & Yanez de Aldecoa, 2021) from the global perspectives have been conducted on the demographic features of teachers when it comes to their knowledge and utilisation of the TPACK paradigm during instruction. Gomez-Trigueros and Yanez de Aldecoa (2021) conducted a study that focused on whether or not there are any disparities by gender of both in-training and employed instructors in terms of their Digital Competence. The study revealed a gender imbalance of teachers in terms of the digital capability of instructors. Alternatively, there was no appreciable gender imbalance in the utilisation of technology among elementary mathematics and science instructors as divulged by Jang and Tsai (2012). Additionally, Anthony, Subali, Pradana, Hapsari, and Astuli (2019) researched the impact of instructors' qualifications and instructional experience on TPACK. Cetin-Berber, and Erdem (2015) examined Turkish teachers' training in TPCK. Findings from the study show no appreciable disparity as it relates to age and the development of teachers' TPACK. This also implies that age does not significantly affect future educators' training perceptions about TPACK.

The advent of the TPACK theoretical framework presents a promising approach aimed at empowering educators and educational authorities to acquire the necessary understanding and skills for integrating technology into education (Mishra & Koehler, 2006). Recent examinations by Appiah (2018), Afari-Yankson (2021), and Pringle, Dawson, and Ritzhaupt (2015) reveal that despite numerous studies on TPACK, relatively little attention has been given to its application in History instruction. Several scholars (Yellay, 2017; Hsu, Yeh, Yi-Fen, Lin, Hwang & Wu, 2015) have investigated teachers' technological and pedagogical content knowledge, albeit in diverse socio-cultural contexts. The latter study was conducted in Taiwan, focusing on science teachers, while the former was carried out in Ghana, focusing on Social Studies teachers. It was from this backdrop that this study planned to conduct an assessment of History instructors' technological pedagogical content knowledge in the senior schools in Montserrado County Educational District 1B, Liberia, and whether there exist imbalances of History instructors' level of TPACK as it relates to age, teaching experience, gender, and qualification.

Statement of the Problem

Students are not attracted to learning History because they believe it is only about attaining knowledge and using memorization procedures (Ali, Ahmad, & Seman, 2017). Similarly, referenced in Turan (2010), Loewen contends that students believe History classes to be about reading textbooks, retaining information, paying attention in class, and passing tests. Moreover, since history lessons are usually teacher-centred, students have few or no chances to engage

actively in the activities during instruction and learning (Cobbold & Adabo, 2010). Cobbold and Adabo further state that this makes students not understand what is being taught. Based on the findings of Ali, Ahmad, and Seman (2017) and Oppong and Cobbold (2010) regarding students' lack of interest in studying History, it seems evident that a new approach to teaching History is necessary. It appears that history instructors in schools in Montserrado County Educational District 1B, Liberia lack the essential technological pedagogical content knowledge possibly contributing to poor outcomes for students in the WASSCE.

According to WAEC Liberia (2016) results, out of 42,000 students who sat the examination, merely one student achieved the Division One Level required for university admission. Similarly, in the 2017 History examination, out of 35,000 students, a mere 4,500 passed, with a staggering 30,500 failing. Furthermore, in the 2018 WASSCE History exam, only 12,750 out of 38,000 students passed, leaving 25,250 students unsuccessful.

However, in trying to mitigate the appalling results of students, the Liberian government implemented an ICT Policy in 2019 to steer the nation towards a burgeoning digital era (Kaloostian, & Chhetri, 2021).). Yet, despite this initiative, the outcomes of History examinations remain disheartening. According to WAEC Liberia, in the 2020 History exams, out of 39,263 candidates, 17,767 (45.29%) passed while 21,496 (54.75%) failed. There was a slight improvement in 2021, with 40,977 candidates participating, of whom 24,730 (60.35%) passed and 16,247 (39.65%) failed. However, the 2022 History test results were distressing; only 16.43% or 5,760 students out of 36,000 passed, marking the

lowest passing rate recorded. This suggests that without addressing how students perceive History education and learning in Liberia, there could be limitations in fostering patriotism, moral values, and critical thinking skills essential for nurturing well-informed, patriotic, tolerant, and responsible citizens.

History instructors must blend technology with pedagogy and content to motivate students to like learning and increase their performance (Koehler & Mishra, 2005). For this to occur, lectures on History contents should be taught in a way that is engaging and authentic, to arouse pupils' interest as well as involvement in educational opportunities that permit them to accept and develop the characters and attitude of a scientist. Historical Content or lessons should also be practically represented in lectures during instruction. Films, photos, audio and visual recordings, and well-designed computer programs may all be included in History classes to make learning and teaching more engaging and exciting. The responsibility of History instructors is to create new ways and ideas to boost students' subject knowledge and equip them to change the future (Akin, Calik, & Engin Demir, 2017).

The advent of the TPACK theoretical framework presents a promising approach aimed at empowering educators and educational authorities to acquire the necessary understanding and skills for integrating technology into education (Mishra & Koehler, 2006). Recent examinations by Appiah (2018), Afari-Yankson (2021), and Pringle, Dawson, and Ritzhaupt (2015) reveal that despite numerous studies on TPACK, relatively little attention has been given to its application in History instruction. Several scholars (Voogt et al, 2013; Hsu, Yeh, Yi-Fen, Lin,

Hwang & Wu, 2015) have investigated teachers' technological and pedagogical content knowledge, albeit in diverse socio-cultural contexts. The latter study was conducted in Taiwan, focusing on science teachers, while the former was carried out in Ghana, focusing on Social Studies teachers.

In contrast, while studies have been conducted in Liberia concerning technology, there has been a lack of research on the TPACK Model. For example, Segbe (2020) investigated the correlation between K-12 Educators' Awareness of Technology and their inclination to utilize technology as an instructional tool. Additionally, Kaloostian, and Chhetri (2021) undertook a study examining students' academic performance in Liberian universities, their utilization of ICT, and their technical proficiency. However, all of the aforementioned research focused on various content areas or disciplines. Due to the scarcity of literature on the application of TPACK in History education, the researcher has chosen to investigate History instructors' technological and pedagogical content knowledge in Montserrado County Educational District 1B, Liberia. This makes it important to conduct this study to establish History teachers' level of TK, TCK, TP and TPCK of History teachers as well as find out the effect of the teachers' gender, age, academic qualification and their teaching experience on their use of TPCK. This will help government education policymakers be informed about what they can do to ensure that history teachers competently use their skills and better the academic performance of the learners.

Purpose of the Study

The purpose of this research was to assess History instructors' technological, and pedagogical content knowledge in the senior high schools in Montserrado County Educational District 1B, Liberia. The following objectives specifically guided the study:

1. examine the level of TK of History instructors in the senior high schools of Montserrado County Educational District 1B, Liberia.
2. assess the level of TCK of History instructors in the senior high schools of Montserrado County Educational District 1B, Liberia.
3. ascertain the level of TPK of History instructors in the senior high schools of Montserrado County Educational District 1B, Liberia.
4. examine the level of TPCK of History instructors in the senior high schools of Montserrado County Educational District 1B.
5. identify the difference in History instructors' TPCK based on gender.
6. establish the difference in History instructors' technological and pedagogical content knowledge based on age.
7. ascertain the difference in History instructors' technological and pedagogical content knowledge based on academic qualification.
8. establish the difference in History instructors' technological pedagogical content knowledge based on teaching experience.

Research Questions

1. What is the level of TK of History instructors in the senior high schools in Montserrado County Educational District 1B, Liberia?

2. What is the level of TPK of History instructors in the senior high schools of Montserrado County Educational District 1B, Liberia?
3. What is the level of TCK of History instructors in the senior high schools of Montserrado County Educational District 1B, Liberia?
4. What is the level of TPCK of History instructors in the senior high schools in Montserrado County Educational District 1B, Liberia?

Null Hypotheses

$H_0$1: There is no statistically significant difference in History instructors' technological, and pedagogical content knowledge based on gender.

$H_0$2: There is no statistically significant difference in History instructors' technological, and pedagogical content knowledge based on age.

$H_0$3: There is no statistically significant difference in History instructors' technological, and pedagogical content knowledge based on academic qualification.

$H_0$4: There is no statistically significant difference in History instructors' technological, and pedagogical content knowledge based on teaching experience.

Significance of the Study

The results from this study would encourage teachers to take part in professional development programmes designed specifically to improve their technological skills and knowledge. These programmes can provide hands-on training, workshops, and resources to assist them in becoming more skilled in using Edu-tech. This would help develop consciousness among History

instructors on the knowledge domain they need for 21st-century efficacious teaching. Through this, the technological awareness of History instructors would be awakened. This implies that History instructors would be knowledgeable in pursuing technologically applicable ways to meet the 21st-century demands of classroom instructors effectively.

In support of those mentioned above, the study results will support the Liberian Ministry of Education Curriculum Development Sector and History instructor education institutions' endeavour to include the TPACK curriculum in their training program documents. This would give instructors the knowledge required to efficaciously incorporate digital technology into History classrooms and instruction while utilizing the TPACK framework. The study's results would also help policymakers and educational planners reformulate and improve strategies for efficiently incorporating digital technology in History instruction and learning of the discipline.

History instructors would profit from the study as the level of their TPACK competence would be revealed. This would inform the methods they utilized when teaching if they have to acquire more skills and understanding as it relates to technology, pedagogy, and content. Ultimately, this can influence History teachers' attempt to build their technological, and pedagogical content knowledge domain that would guarantee that suitable technologies are infused in their lessons and throughout their instructional endeavours.

Moreover, the study findings would unravel whether there exist imbalances in age, teaching experience, gender, and qualification of History

instructors' TPACK level. Finally, the study's results will add to the current works regarding the utilization of the TPACK framework during instructions. They will also serve as a primary document for scholars who intend to conduct studies on the assessment of History instructors' TPACK.

Delimitation

This research was restricted to History Teachers' Technological and Pedagogical Content Knowledge. The study was dedicated to History instructors at Secondary Schools in Montserrado County Educational District 1B, Liberia. The TPACK paradigm served as the foundation for the conceptualizations used in this study. Alternatively, the study did not evaluate History instructors' Pedagogical Knowledge, Content Knowledge, and Pedagogical Content Knowledge. This exemption is due to several research initiatives focusing on TPACK including pedagogical content knowledge underpinnings (Afari-Yankson, 2022; Appiah, 2018; Hsu, Yeh, Yi-Fen, Lin, Hwang & Wu, 2015).

Limitations

The failure to generalize the results of the study regarding assessing History instructors' technological, and pedagogical content knowledge in the secondary schools of Montserrado County Educational District 1B and the methods that were utilized in collecting information from respondents of this research are some of the major causes of the limitations that were found in this research. Regarding the study's generalizability, it is possible that the relatively small sample size prevented the findings from being applied to instructors of other disciplines in Liberia or the world at large. The results therefore only apply to the study

respondents. Relating to the instruments, according to Johnson and Christensen (2012), studies using a questionnaire do not offer comprehensive details regarding the instrument. This suggests that if different instruments such as an interview guide were utilized in obtaining data from the participants, the findings would prove to be more accurate and comprehensive because the researcher might have gotten the chance to probe participants' responses thoroughly. Additionally, the instrument primarily was closed-ended questions. This implies that participants will have no choice but to choose a predetermined option when answering questions on the questionnaire. To compensate for any limitation, these questionnaires were detailed sufficiently to guarantee that the most essential issues were addressed.

Organizations of the Study

This research study consisted of five main chapters that were organized into a logical progression. Chapter One covered the study's introduction, which included the background, a statement of the problem, the research objective of the study, research questions, significance, delimitations, and limitations, and the organization of the study. The second chapter was devoted to an assessment of pertinent literature. It addressed the study's conceptual framework and empirical foundation. Research methods were covered in Chapter Three which consists of population, sampling procedure, research design, research instrument, validity and reliability of the research instruments, and data collection and analysis. The fourth chapter dealt with the discussion of the study's results/findings. The fifth and last chapter presents a research summary, conclusions based on the results, and recommendations.

CHAPTER TWO

LITERATURE REVIEW

Overview

The chapter concentrated on a review of relevant literature on this research. This literature review aimed to offer an analogy of the problems and outcomes of this study with comparable research studies to offer a foundation for confirming or denying previous studies and their findings. Mishra and Koehler's (2006) theoretical paradigm guided the study. The review of relevant literature comprised three segments. First, the theoretical review was discussed and segmented into subgroups of the TPACK Paradigm. The conceptual review comprised Educational Technology, Benefits of ICT Integration in Teaching and Learning, History Education in Liberia, and Technological tools in History Education. The empirical review looked at findings from other works relating to the nature of this research.

Theoretical Framework: TPACK Paradigm

It is challenging to locate or create a theoretical underpinning in instructional technology. Notwithstanding, the theoretical TPACK paradigm of Mishra and Koehler (2006) presents an accurate model to guide the usage of ICT in History learning and instruction. Separating classroom teachers' understanding of their subject matter from their comprehension of the necessary methodologies in delivering lessons relating to that subject matter is a fruitless task (Shulman, 1986). In his view, this type of segregation leads to classroom instructors who are either pedagogy-focused or subject-content instructors. To reconcile this

dichotomy between the two concepts, the idea of Pedagogical Content Knowledge was introduced by Shulman (1986) to resolve this apparent contradiction. Fortunately, since technology has been incorporated into what might be referred to as "the first connection," namely, content knowledge and pedagogical knowledge, educators and researchers need to develop the idea more deeply.

Mishra and Koehler (2006) developed a theoretical framework called technological pedagogical content knowledge, which builds upon Shulman's (1986) definition of pedagogical knowledge. This framework adds a third component and focuses on how educators integrate technology into their instructional practices. In addition, it also aims to address the intricate, complicated, and situational nature of this knowledge while trying to reflect some of the fundamental qualities of expertise needed by an instructor for integrating technology into instruction. By so doing, they highlighted the intricate interconnections between content, pedagogy, and technology in the learning environment. According to Mishra and Koehler (2008), "TPACK" entails instructors comprehending the relationship between content, pedagogy, and technology to facilitate efficacious technology-enhanced instruction.

The term "Technological Pedagogical Content Knowledge" was brought to education as the "Full Package" for effective technology-based instruction (Thompson & Mishra, 2007). The acronym (TPCK) according to Mishra and Thompson (2007–2008), was changed to TPACK (pronounced "tee-pack"), to enhance memorization and create a more unified understanding of the three types of knowledge encompassed in the framework: content, pedagogy, and technology.

Many academicians and education professionals see the TPACK acronym as pointing toward the framework's interdisciplinary perception, which emphasizes the significance of the various parts of the model.

According to Bueno, Niess, Engin, Ballejo, and Lieban (2022), initial proposals for TPCK emerged from the research of several scholars (Pierson, 2001; Zhao, 2003; Angeli & Valanides, 2005; Niess, 2005), who saw it as a unique blend of technology, subject matter, and teaching methods. Pierson made use of ICT in 2001; Niess (2005) created the phrase "technology-enhanced PCK" to portray the incorporation of novel ICT into teaching, and Saltan, and Arslan (2017) utilized a related comparison of PCK to relate to technology. TPACK according to Mishra and Koehler (2006) was introduced to consider the relevant interrelationships between the components, to address the connections between the relevant components of the paradigm (subject matter, teaching methods, and technology). During this study, until a specific citation is made to a specific author who utilizes TPACK, the researcher will utilize the acronym to maintain continuity. As a result, the terms TPACK AND TPCK will be synonymously used as the alteration in phraseology was not internationally endorsed, and this modification will not dwindle the conceptual meaning and significance of the idea with the context of History education.

Preserving ICT discrete from pedagogy and curriculum according to (Hooper & Rieber, 1995; Cuban, 2001), as opined by many scholars and educators is an injustice to kids, since it promotes misuse and, in some cases upright abandonment. As a result, according to Mishra and Koehler, (2006), many

of these experts and researchers have suggested expanding Shulman's model. The merging of pedagogy, content, and technology cumulated into the TPACK framework.

In the context of History teachers incorporating ICT into pedagogy and content for practical and systematic learning and instruction, the researcher implemented Mishra and Koehler's (2006) concepts of the TPACK model (see Figure 1). This demonstrates that History instructors wishing to use Edu-tech during instructions and in lessons must also be experts in content and pedagogy. Teachers must tackle the issues of technology, content, and pedagogy concomitantly if they are to remain effective. Integrating these knowledge bases can create a cross-section of three imbrication circles of the bodies of knowledge. The focus of the "convoluted interchange" is at the centre of these bodies of knowledge (technological knowledge, content knowledge, and pedagogical knowledge. The centre (tr) is the intersection named technology.

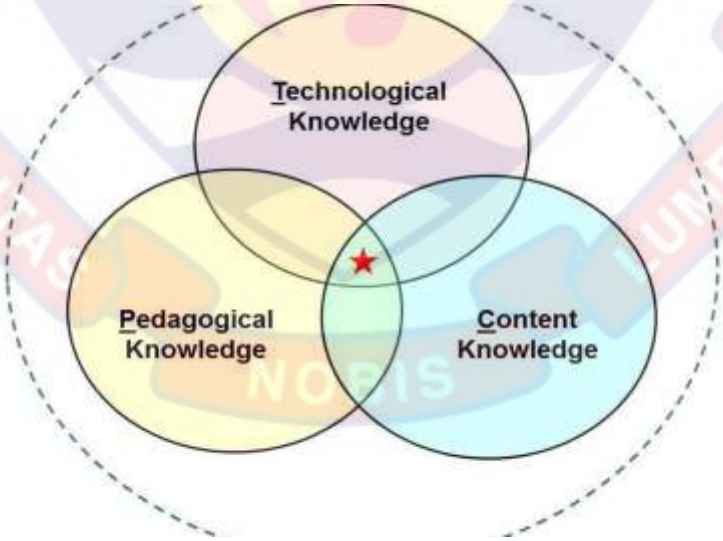

Figure 1: **Diagram of the 2006 TPACK Paradigm by Koehler and Mishra**

According to Niess, as cited in Bueno, Niess, Engin, Ballejo, and Lieban (2022), two competing perspectives (integrative and transformative) were proposed to define TPACK. According to Niess (2019), an integrative perspective seeks to prepare instructors for the technological world, emphasizes the uniqueness of the paradigm's many subgroups, and emphasizes training in each field. The transformative perspectives portray instructors' knowledge as a unified whole, formed by the fusion of the many subgroups generated at the intersections of subject matter, teaching methods, and technology. These subgroups are then reorganized, combined, categorized, incorporated, and accommodated so they can no longer be separated.

Technological Knowledge

Technological knowledge (TK) within the TPACK framework constantly changes more than pedagogy or content knowledge. As a result, defining it has proven to be quite challenging, and the definition of technological knowledge in this text may become obsolete by the time it is printed. Nevertheless, certain approaches to understanding and using technology can be used with any technological device or resource Koehler, Mishra, and Cain, (2013). It is important to remember that a precise manner of imagining and interacting with ITC is universal. The description of Technological knowledge used in the model of TPACK is similar to that of Fluency in Information Technology (Fitness), which was put forth by the National Research Council's Committee on Information Technology Literacy (NRC, 1999).

They contend that FITness transcends the conventional ideas of IT proficiency to prefer that people be cognizant of information technology mainly when utilizing it productively in their job and daily activities, to understand whenever it is beneficial or detrimental in achieving a particular objective, and to be able to adjust to the ever-evolving nature of IT continuously. Because of this, Fitness demands a broader, more basic understanding and competency of IT for processing data, dialoguing, and problem-solving than the conventional meaning of computer knowledge and competence. Obtaining Technological knowledge in this way permits an individual to perform a wide range of responsibilities using information technology and devising multiple approaches to completing a given task. In this conception of Technological Knowledge, there is no "end state"; instead, it recognizes it is developing across an extended period of creative, unrestricted engagement with technologies. Knowledge of PowerPoint, multimedia, software, interactive whiteboards, and other cutting-edge technologies like the internet and digital film is considered technological knowledge (TK) (Jang & Tsai, 2013).

Furthermore, Technological knowledge includes the capacity to operate overhead projectors, laptops, and Web-based learning apps (e.g., WhatsApp, Twitter, and Facebook) (Chai et al., 2011). Technology knowledge (TK) encompasses more sophisticated and complex technologies like the web and internet-based film and more basic ones like books, chalk, and blackboards (Mishra & Koehler, 2008). It also relates to the skills required to utilize various technology. Within digital innovation in education, familiarity with desktop

operating systems, knowledge of hardware and software, and proficiency with common software toolkits such as web browsers, email, Excel, and Microsoft Word are considered TK. In addition to conventional concepts of technological education, instructors need to possess a comprehensive and adequate understanding of technology in applying it efficiently at their job and in their daily lives, acknowledge when technology can aid or hinder the pursuit of an objective, and be capable of adjusting to the constant technological advancements. The majority of conventional technology seminars and classes are geared to assist individuals in learning these abilities.

Technological Pedagogical Knowledge

Technological pedagogical knowledge is a grasp of how a specific technology may affect students' teaching. This involves understanding various technology instruments' educational opportunities and restrictions about discipline- and developmentally relevant instructional designs and tactics. To construct TPK, more in-depth familiarity with the limitations and possibilities presented by technology and the disciplinary settings in which they are used is required. TPK is also investigating the presence, features, and potential of different technologies currently employed within the context of education, as well as how teaching may alter as a consequence of certain innovations being adopted. This might include realizing there are several tools available for teaching a particular lesson, choosing the best tool for the lesson to be taught, knowing how to utilize the tools, being aware of instructional methods, and using such methodologies with technology. This requires having knowledge of the tools

utilized to monitor pupils' involvement, presence, and academic performance and understanding basic technological concepts such as chat rooms, WebQuests, and message boards.

Considering how the advantages of technology can vary depending on the purpose and context for which it is utilized, it is crucial to recognize TPK. Because most renowned software applications are not created for instructional objectives, TPK acquires a unique importance. Most Microsoft products, including PowerPoint, Google Docs, Spreadsheets, and Yahoo Mail, are created with corporate environments in mind. Blogging and podcasts are two examples of internet platforms often used for networking, communication, and entertainment. As cited in Nielsen, Clemmensen, and Yssing (2002), Duncker points out that, teachers need to develop pedagogical skills that enable them to go beyond conventional uses of technologies, redesigning them for instructional usage. To successfully utilize TPK, teachers must be forward-thinking, innovative, and observant when employing technology to enable pupils to learn and comprehend the lessons.

Technological Content Knowledge

The knowledge of the relationship between technology and content is referred to as technological content knowledge (TCK). Even though technology restricts the kinds of expressions that can take place, novel technology is typically more adaptable to novel and distinct expressions. It gives users a considerable degree of openness when manoeuvring these descriptions. Instructors must comprehend the course material they teach and how the course content may

change due to technology usage. To create the best technological tools for educational purposes, it is essential to comprehend how technology affects the implementation and understanding of a given discipline. The kind of subjects taught or learned can be facilitated and constrained by the technology choices, in the same way that some content selections might limit the technology employed (Mishra & Koehler, 2008). Technology might restrict the sorts of representations that can be created, but it can also enable the creation of more updated and diverse characterizations.

Additionally, technological tools may offer more flexibility when navigating these representations. TCK also comprehends interactions between technology and content and how either imposes limitations on the other. Teachers need to be well-versed in the content they cover and how the usage of particular information technology might affect that content (or the kinds of representations that can be developed). Instructors must grasp whatever technological innovations are most successful for learning particular topics in their disciplines and how content influences or changes the technology.

Technological Pedagogical Content Knowledge

The term "TPACK" refers to the combined understanding of the three essential knowledge domains (content, pedagogy, and technology), with an emphasis on how ICT may be specifically designed to suit instructional demands to teach a particular subject in particular circumstances (Koehler, Mishra, Akcaoglu, & Rosenberg, 2013). They further opine that every single one of the knowledge domains that make up TPACK is an essential and significant

component of instruction. But good instruction goes far beyond the sum of its parts (Technological knowledge, Pedagogical knowledge, and Content Knowledge). When a teacher uses TPACK, their comprehension of technology, methodology, and subject are combined to aid in creating educational opportunities for learners. The intricacy of education is shown through the TPACK paradigm. The paradigm contends that successful technology-enhanced instruction results from addressing all the parts simultaneously. The framework also serves as a conceptual or theoretical framework for academics and educationalists to evaluate in-training and employed instructors' competence in successfully presenting their lessons using ICT.

TPACK, on the other hand, remains the foundation for successful ICT incorporation within educational settings and classrooms. It necessitates comprehension of the interpretation of theories using the latest technology. These educational methodologies use technologies in meaningful ways to teach a subject or present a lesson, and comprehend what ends up making theories complex or uncomplicated to understand. Additionally, these educational methodologies utilize technologies to evaluate the manner through which technology can alleviate challenges faced by learners, recognise pupils' previous skills and comprehend theories of ontology and knowledge, and have knowledge of how innovations can enhance learning and instructional processes. Effective teachers utilize TPACK whenever they instruct by combining their expertise in technology, pedagogy, and theme at the same time. Any circumstance posed to teachers is a distinctive blending of these components. As a result, no singular software

platform pertains to any teacher, course, or instructional philosophy. Instead, the primary means of discovering solutions is for instructors to be able to handle the complex interaction between content, pedagogy, and technology in a variety of situations. Completely disregarding the intricacies of each case study or the difficulties of the connections between the elements can lead to overly simplistic remedies or malfunction. Therefore, teachers must cultivate competency and behavioural versatility across all core components (TK, PK, and C) and within how these domains and situational variables interact to generate efficient strategies. We must consider this in-depth, adaptable, practical, and sophisticated understanding of technology-based instruction when considering TPACK as a professional competence conceptual framework.

Conceptual Review

History of Educational Technology

The utilization of technology within an educational setting is not new and has been around for some time now. This utilization of technology has progressed from using pencils, chalk, and blackboards to, more recently, using computers, overhead projectors, novel technologies, and films (Edwards & Roblyer, 2000). Molenda (2008) and Nye (2007) also weigh on this assertion by stating that the origins of creating tools to facilitate learning through ways that are quicker, more reliable, affordable, or simpler than earlier methods can be attributed to the development of rudimentary tools, such as cave wall paintings. At least a thousand years have passed since the invention of the blackboard and the writing slate (Sachau, 2013). Since their inception, pamphlets and books have

significantly influenced education. Replicating devices like the Gestetner and mimeograph stamp machines were developed in the early 20th century to facilitate the production of short copy runs (typically 10 to 50 copies) for use in the home or learning setting.

According to most sources, the emergence of instructional films in the 1900s and Sidney Pressey's mechanical teaching apparatuses in the 1920s marked the beginning of media utilisation for learning (Saettler, 1990). Since their introduction in the 1950s, slide projectors have found widespread use in classrooms and other educational institutions.

The 1960s witnessed more improvement in educational technology usage in the learning environment. For instance, the University of Illinois started a classroom system grounded on linked computer terminals. Pupils had the ability and skill to access informational materials on a specific subject, whereas hearing pre-recorded lessons through a remotely connected device such as audio or television in this classroom (Woolley, 2013). In addition, Patrick Suppes and Richard C. Atkinson professors of psychology at Stanford University, researched the use of computers in elementary schools in East Palo Alto, California, to educate younger students in the subjects of reading and mathematics. Bernard Luskin was the first to use a computer to teach in a higher education setting. This happened in 1963. He developed the concept of computer-assisted instruction through collaboration with his fellow teachers at Stanford University.

Starr Roxanne Hiltz and Murray Turoff made contributions to computer-based education at the New Jersey Institute of Technology in the 1970s and

1980s, respectively (Hiltz, 1990); they also made contributions to advancements at the University of Guelph in Canada (Mason & Kaye, 1989). By the middle of the 1980s, many college libraries had implemented systems that allowed students to access course materials. The student interacted with computer drills or micro-world simulations as part of the learning process in computer-based training (also known as CBT) and computer-based learning (also known as CBL).

Midway through the 1980s, digitized networking and communication in education began. Educational establishments started providing courses that could be completed at a distance by using computer networking as a source of information to capitalize on the newly available medium in contrast to later systems built on the principle of collaborative learning supported by computing (CLSC), which promoted the joint construction of knowledge, early e-learning platforms, centered around computer-based learning/training, often mirrored authoritarian instructional practices in which the primary objective of the e-learning system was presumed to be for transmitting knowledge.

A vital pioneer in the educational technologies used today was videoconferencing. This piece of work was especially well-liked by museum instructors. According to Johnson, Levine, Smith, and Smythe (2009), in 2008–2009, more than 20,000 schoolchildren in Canada and U.S.A. used videoconferencing, which has become more and more prevalent in today's educational settings. However, the drawbacks of this type of educational technology are perceivable: Video conferencing necessitates the creation of a mini-television studio inside the museum for live streaming, the limitation

of space ends up as an issue and both the service provider and the audience member need specialized equipment. Image and sound quality are frequently distorted or blurred (Crow & Din, 2009).

The popularity of online learning is rising quickly, and it is now an appealing replacement to conventional classrooms. According to Aryal and Pereira (2014), the Council of Europe adopted a resolution in 2008 approving the prospect of online education to advocate for educational reform and equality in the European Union countries.

Currently, Computer-mediated communication is the dominant model where the computer is the main point of contact between students and teachers. Regarding learning, computer-based training, and computer-based learning typically refer to the personalized gaining of knowledge (self-study). In contrast, computer-mediated instruction (CMC) involves teacher/lecturer assistance and calls for the secularizing of adaptable educational tasks. In addition, contemporary information and communication technology offers educational institutions the means to support educational groups and the knowledge management activities that accompany them.

Thanks to the digital age, learners can access various educational materials through media (Geer & Sweeney, 2012; Craft, 2012). Financial support is being given to schools by organizations like Verizon, Google, and Microsoft to assist in equipping learners with the ICT skills and knowledge they need to improve their academic performance.

Meaning of Educational Technology

Before attempting to comprehend educational technology, it is necessary to comprehend what it is initially. Generally, people consider technology as artefacts, including tools, appliances, automobiles, computers, software, etc. (Brückner, 2015). This indicates that everything is technology and technology is everything. But technology goes beyond these audible and palpable things. According to Brückner (2015), technology uses scientific knowledge and tools to change, create, and improve systems, processes, and products for real-world applications. In his definition of technology, Herschbach (1995) describes it as "organized knowledge that can be used in real-world practices" (p.31). On the other hand, technology as a distinct phenomenon describes the use of information, resources, techniques, tools, power sources, and systems to enhance the quality of life, streamline processes, and increase productivity.

Even though many people consistently view technology as desirable and beneficial, there are also serious analyses of it. For instance, in line with Johnsen and Taylor (2002) and Postman (1993), ICT, according to McDermott (1962) as cited in Johnsen and Taylor (2002), relates primarily to systems of justified command over a substantial number of events, machine, and people by a limited number of highly trained individuals functioning through a hierarchical structure. In conclusion, Johnsen and Taylor (2002) and Postman (1993) share McDermott's concern about the human consequences of technology rather than its inception. These researchers believe that technological advancement is driven by an urge for control and curiosity about what technology deprives us of.

The phrase "Educational Technology according to the Association for Educational Communications and Technology (AECT), as mentioned in (Garrison & Anderson,2003; Januszewski & Michael, 2007; Lowenthal & Wilson, 2010), is the concept and method of designing, developing, utilizing, managing, and evaluating procedures and materials for learning are referred to as educational technology. It addresses a variety of tools and devices as a concept, including machines, networking hardware, and media, while also considering theoretical stances for their successful usage (Richey, 2008; Garrison & Anderson, 2003). Roblyer and Edwards (2000) argue that when the phrase "educational technology" is mentioned, teachers immediately conjure images of them employing a variety of tools or devices, primarily computers. Over the past few decades, educational technology has grown and structured (Salomon & Almog, 1998; Kersley, 1998; Edwards & Roblyer, 2000; Wiley, 2000; ACET, 2004).

Because of recent advances in our awareness of the processes associated with the human acquisition of knowledge and the foundational knowledge of instructional methods, the theory and practice of educational technology have run into several hurdles and adjustments (Salomon & Almog, 1998; Kearsley, 1998; Edwards & Roblyer, 2000; Wiley, 2000; ACET, 2004). Accordingly, educational technology concepts have changed over an extended period and continue to do so (Seels & Richey, 2012).

The phrase "educational technology" can be misunderstood or misused. For instance, the phrase "educational technology" (which encompasses the technology used to teach students) and "instructional technology" (which implies

a theory, idea, and discipline concerned with supporting learning using technology in "controlled and purposeful" scenarios) are frequently used together (AECT,1977, p.3). Similar to how "information technology in education," which does not mean the same as "educational technology," is frequently misunderstood, "information technology in education" is not necessarily educational technology (Brückner, 2015). According to Sancho-Gil, Rivera-Vargas, and Miño-Puigcercós (2020), "technology in education" (or "ed-tech") refers to the usage of technological tools in educational settings. Alternatively, information technology in education refers to using ICT to support education within organizations like those involved in health, food, and finance. Educational media, instructional development, and educational designs are some other names for the field that are occasionally used (Reeves, 2006).

Although educational technology is a "developing" field, Roblyer and Edwards (2000), as cited in Brückner (2015), claim that one aspect of it has remained constant throughout time: its concentration on the “procedures," as "the purpose of educational technology is a procedure and not a result."

Types of Instructional Technology

Technology in education can be used in a variety of contexts and for a variety of purposes. It refers to incorporating scientific and technological knowledge, plus psychological and pedagogical theories and methods, into the educational process. It has thus provided the needed practical and theoretical means for enhancing the procedures and outcomes of learning and teaching

associated with regulated and unregulated education. The types mentioned above of educational technology can generally be divided into the following categories:

(A). Behavioural ICT

(B). Instructional ICT

(C). Teaching ICT

(D). Instructional design ICT

Behavioural Technology

Behavioural technology is used to study and change the behaviour of all living things (Dallery, Kurti, & Erb, 2015). Technically speaking, behavioural technology can additionally refer to non-learning-based behavioural adaptation techniques. However, in educational settings, according to Allan (2017), the application of behavioural technology usually has to do with behavioural evaluation and alteration of behaviour based on the concepts of operant training (creating the intended behaviour) and learning by observation (imitating a model behaviour).

Instructional Technology

Instructional technology is intended to assist the teacher and the student in carrying out the intended teaching objective to achieve the specified educational goals in a specific learning and teaching circumstance (Isman, 2011; Davies, Dean, & Ball, 2013). The word "instructional" refers to a directive intended to obtain particular skills, understanding, and information regarding an event, procedure, or system. With this approach, instructional technology attempts to determine what kind of teaching and materials for instruction will be required in a

specific learning and teaching context before offering strategies for utilizing that instructional content in a way that will allow the learning objectives to be effectively realized. Using instructional methods, media, and content to realize the specified instructional objectives in a particular learning and instruction context, instructional technology can be defined as a component of technology for education that aids the teacher or student directly as a component of auto-instruction or self-education (Cennamo, & Kalk, 2019).

Teaching Technology

Teaching technology is a branch of educational technology that organizes and facilitates classroom instruction (Earle, 2002; Davies, Dean, & Ball, 2013). As a technician, an instructor must be well-versed in the craft and science of instructing. Teachers who want to be effective in their profession should view teaching as a technology they must master. In addition to having solid and extensive subject matter expertise, teachers need strong technical abilities to incorporate technology into the classroom effectively. The three main pillars of efficient teaching include communication, content, and feedback. This indicates that teaching is a scientific process.

The philosophical and instructional practices of teaching are processed by teaching technology. A teacher who intends to have an engaging and collaborative learning environment must learn the skills and craft of this technology. In his book Management of Learning, Davies (1971) lays out the four phases that outline the specifics of what an instructor needs to know and do to become a successful educational specialist. According to Davies (1971), these steps are

organization of teaching, leading of teaching, planning of teaching, and controlling of teaching.

Instructional Design Technology

In education, instruction facilitates the development of an ideal instructor-student relationship. An effective lesson is focused on objectives along with a particular intent or motives, which implies that the ways by which a student is taught or given instruction (assists in his acquisition of knowledge) ought to be planned, thoughtfully designed, and successfully regulated constantly. Thus, the phrase "instructional design," in its most basic sense, refers to an organization or arrangement outlining how an educational process, which includes both instruction and learning and their interface ought to take place to achieve the objectives that have been established.

It could be argued that instructional design technology takes a novel, differentiated approach, such as the systems-based method, the cybernetic procedure, or training psychological sciences, to exert such command and influence to produce educational designs with a crystal-clear purpose that aid both the instructor and the student in accomplishing the predetermined goals.

Benefits of ICT to Learning and Instruction

Why do teachers employ technology in the classroom? Why do teachers incorporate technology in their lessons? What potential does technology have for enhancing learning and teaching? There are undoubtedly benefits to using technology in learning environments, even though this is one of the most pressing issues currently being discussed in education. Since the turn of the 20th century,

educators have been quick to accept technological advancements in the classroom in the hopes that these tools will create more engaging and effective educational settings or add new dimensions to more conventional methods (Thornburg, 1999; Fulton, 1998; Roblyer & Edwards, 2000). Several parents, instructors, and pupils think that the benefits of using technology in the classroom are self-evident because 1) "studies" have shown where and how technological approaches are efficient" and 2. "Technology is everywhere and therefore should be in education (Roblyer & Edwards, 2000, p. 12),

The 21st century has seen a revitalization of the educational system. The age of technological advancement is here to stay, and it is widely anticipated that the application of technology will make education more accessible. UNESCO's (2002) finding corroborated this assertion by stating that schools and teachers are under growing pressure to utilize cutting-edge technology to provide learners with the understanding and abilities they need to succeed in the twenty-first century. Essentially, educators are expected to be capable of employing technology to teach, not merely in the local setting in which they are trained but also in a global setting. In addition to using technology effectively in the classroom, LeCompte (2004) argues that educators also require the capacity to function as technological integrators and peer consultants to effectively assist their colleagues in keeping up with the rapid advancements in the breadth and depth of available technological resources. Utilizing technological integrators implies that educators ready to teach with technology will boost their instructional skills and act as a tool for in-service instructors to receive hands-on training.

Teachers must be prepared and skilled in using technology in their lectures to participate actively in the current era of educational instruction that technology has brought about. Educators may incorporate technologies and the necessary technological tools into their instruction by employing a constructivist attitude. According to Toe, as cited in Afari-Yankson, 2022, the constructivist viewpoint enables educators to use technology to "widen instructional limits, link pupils with practical happenings, as well as assist pupils toward becoming self-sufficient students" through engaging and comprehensive learning. The most efficient way to change classroom instruction and teachers' attitudes and comprehension, according to Watson (2007), is to incorporate technology into the teaching environment. This will help students today receive the necessary education and academic advances they need to succeed in society. Technological-driven learning environments with technological resources improve student learning by allowing teachers to abandon ineffective instructional practices in favor of more engaging and effective ones (Matzen & Edmunds, 2007).

Many academics have discussed how important educational technology is in the modern dispensation. According to Al-Alwani (cited in Savas, 2011), one of the key advantages of educational technology is that it develops self-supporting learners who can control their learning progress using ICTs. This indicates that integrating technology into teaching and learning enables students to develop the mindset of being capable and knowledgeable of depending on or relying on themselves. In contrast to a conventional learning setting, where learners' abilities are based on the instructor's quality and the lesson's pace, this one does not exist

in a technologically driven classroom setting. It thus suggests that through the utilization of ICT, learners can determine the rate of the process of learning according to their unique pace.

According to Matray and Proulx (1995), technology promotes interaction between learners and increases their engagement and interest in learning. Most learners already have some familiarity with the technological innovations used in today's classrooms, so their attention is more likely to be held when the lesson includes their use. Some benefits of utilizing educational technology according to Becta (2002), involve developing higher levels of learners' motivation and developing a high level of self-worth. He further argues that it involves esteem in learners, improving questioning abilities of students, promoting initiative and self-learning, enhancement of presentation of lectures, development of problem-solving skills in students, promotion of improved knowledge-handling skills, enhanced 'time spent on task,' and improved students' abilities to interact with others.

Roschelle, Abrahamson, and Penuel (2004) posit that utilizing technology for educational purposes can assist learners in four ways: "greater involvement, participatory learning, real-world situations, and regular and instant responses" (p. 253). In addition, technology helps students develop "high-order thinking skills " as well as "higher cognitive abilities," which are important for learning (Wang, Kinzie, McGuire, and Pan, 2010, p. 382). According to Hunsinger-Hoff, (2016), digitalisation can aid education by sparking students' interest and enthusiasm, facilitating access to relevant materials, and providing tactical and strategic

support as they learn. When discussing using the web for educational purposes, Brandstrom (2011) pointed out that, it makes information exchange, instruction, and learning easier. Blogs and other social media audio-visual tools are utilized more frequently in the educational process to encourage and inspire pupils while considering their expertise.

By utilizing these tools, according to Adcock and Bolick (2011), learners can improve and deepen their sense of self-worth through constructivist, student-centred methods. These tools also enable learners and their instructors to jointly create knowledge and meaning that support constructivism within the learning setting. Through this, teachers can now be viewed as instructional stimulators and knowledge negotiators thanks to technology in education (Schneiter, 2010). Utilization of these technological advancements in education according to DeGennaro (2010), is likely to make more pupils grasp and remember materials presented in a classroom using a combination of methods. In agreement, Schneiter (2010) articulates that using different instructional information technologies can assist learners in comprehending, visualizing, and participating in specific dynamic constructs.

According to Kennedy (2020), in 2019, UNESCO placed an even greater emphasis on the positive effects that ICT can have on teaching and learning, citing its ability to widen participation in education, facilitate collaboration among educators, raise the bar for educational quality, promote greater social inclusion, and enhance management. Numerous initiatives have been made to improve

education with the aid of technology integration in professional development programs for the preparation of teachers.

Additionally, according to Jonassen (2000a), ICT is consistently been marketed as a contemporary remedy for issues with learning, including a lack of output, ineffectiveness, and scarcity of priority. Similarly, motivation is one of the key justifications for employing ICT in schooling (Roblyer & Edwards, 2000). Computers in particular, but not exclusively, have increased in power in educational settings, making them just as effective as they are out of the learning environment. Their companies have altered how people conceived of issues and potential fixes. According to Jonassen (2000), they are also called "Mindtools," which is a term for "computer programs which have been specially modified or established to work as intellectual associates alongside students to stimulate and encourage thinking critically and more advanced learning" (p. 9). He opines that utilizing computers in the classroom promotes genuine education, which he defines as being active, constructive, intentional, authentic, and cooperative. When students develop their senses, meaningful learning occurs (Wang et al. 2016). In conclusion, the studies demonstrate that using technology in technology-rich learning environments enhances learning outcomes, motivation among learners, instructor fulfilment, and other significant academic outcomes (Fulton, 1998; Jonassen, 2000a; Thornburg, 1999).

History Education in Liberia

History as an academic discipline has a long tradition of being taught globally. The systematic teaching of history in secondary schools may be traced

back to the efforts of Thomas Arnold, the Headmaster of Rugby from 1828 to 1842 "according to a 1965 report by the Association of Assistant Masters in Secondary Schools (p.1). According to the Association, tremendous progress was achieved in studying History as a discipline in schools and institutes of higher learning during the last thirty decades of the nineteenth century.

However, learning History as an academic discipline started during the introduction of Western Education in Liberia in the early 19th century by Protestant religious groups. At first, it was included in social studies, one of the four core subjects (English, Mathematics, Social Studies, and Science) taught in schools in Liberia. To complete one level (i.e., Elementary, Junior, or Senior High School) of students' academic sojourn, they had to write and pass national exams or WACE Examinations in social studies as a prerequisite for promotion to the next level. These examinations were administered to 6th, 9th, and 12th-grade students respectively. The social studies syllabus for senior high schools during the period according to Jones (1970), consisted of different themes per grade level, and only 11th-grade content was history-related. Jones (1970) also revealed that the basic theme for 10th graders' social studies focused on world Geography—the theme for both the 11th and 12th grades concentrated on World and Economic History respectively. Also, the 6th grade Social Studies theme was Liberia, Traditional Africa, and African History, whereas 9th grade Social Studies was African History which focused on Africa Before and Since 1500.

The Educational Plan of (Í976 - 1985) gives rise to History being taught in schools as a separate subject. With this new educational plan, social studies are

only taught in elementary and junior high schools respectively. According to Kaloostian (2023), History became a core subject in Liberian schools in 1980 after recommendations of a Curriculum Coordination Committee set up by the Ministry of Education in 1973. Unlike the social studies curriculum which includes Economics, Geography, and History, the themes of the History curriculum currently have only contents that are history-related.

History became a core subject in the Liberian Senior High School Curriculum to instil in students a heightened sense of nationalism, acquisition of the skills necessary for the peaceful resolution of conflict, appreciation for the relevance of the study of history, and respect for the values of peace and unity. Also, owing to the complete breakdown of state power (such as the April 14, 1979, Rice Riot, April 12, 1980, Coup, and the 1989 Civil War of Liberia), which led to the killing of a seated president, the killings of public officials, wanton demolition of private and public properties, the lacking of national unity and cohesiveness, the teaching of History education became of significance. It was then necessary that History be taught in schools to make children learn more about their past and heritage, which could promote national unity, national consciousness, and patriotism.

Technological Tools for History Instruction

A technological tool is any device or software that can be used to enhance teaching and learning processes (Kouser & Majid, 2021). These tools include hardware devices such as laptops, interactive whiteboards, projectors, or software and online platforms such as learning management systems (LMS), presentation

software like PowerPoint, or educational games (Njoku, 2015). Technological tools have become increasingly important in teaching as they offer various benefits such as improving student engagement, providing access to a broader range of learning resources, streamlining administrative and instructional tasks, and supporting personalized learning (Saini & Goel, 2019).

Furthermore, Fisher (2012) stated, "The use of technological tools in education has the potential to greatly enhance the learning experience for students by providing new and innovative ways to interact with content, as well as expanding the reach of education beyond traditional classroom settings." Moreover, Barseghian (2011) noted, "With technology, teachers have access to a much wider range of resources to supplement their lessons, as well as tools to support differentiated instruction and cater to diverse learning styles." The use of technological tools in teaching History is an important way to enhance students' learning experience. Technological tools can help students access a wide range of historical resources and primary sources, which can significantly improve their understanding of important historical events and moments. Technological tools can help facilitate interactive and engaging learning experiences, keeping students interested and motivated in the subject matter.

Additionally, technological tools can help support the development of critical thinking skills, which are essential to studying History. By teaching History through the utilization of interactive timelines, virtual field trips, digital storytelling, WebQuests, and other digital resources, students can develop a better understanding of how historical events are interconnected and how different

factors might have contributed to the outcomes of those events (Marcus, Stoddard, & Woodward, 2017; Stoddard, 2009). This can help to build vital critical thinking skills that are valuable both in the study of history and in other areas of life.

Interactive timelines: Interactive timelines can visually represent historical events and help students understand the chronological order of major events (Ivanova, 2021). Using timelines, students can understand the chronological order of events. By placing events in order on timelines, students can see how events are related and how they lead to other events. Timelines also help students understand the context of historical events. Through this, their contextual understandings of events are developed. By placing events on timelines, students can see how events relate to each other and broader historical trends and periods.

Moreover, interactive timelines enable students to understand cause-and-effect relationships between historical events better. Placing events in order on a timeline allows students to see how one event led to another and how events are interconnected. Through interactive Timelines by History teachers during instructions, students can develop critical thinking skills by asking them to analyze and interpret the events on the timeline. For instance, History teachers can ask students to identify historical patterns, trends, and turning points. Overall, interactive timelines are a versatile tool in History teaching that can help students comprehend the sequence of events, the context of historical events, and the cause-and-effect relationship between events.

Virtual field trips are a valuable tool in teaching history because they allow students to explore historical sites, artefacts, and museums from the comfort of their classroom (Morgan, 2015). When teaching history, virtual field trips can be used for the following purposes: First, exploring historical sites: virtual field trips can allow students to explore historical sites and landmarks they might not otherwise have access to. For instance, students can virtually visit the pyramids in Egypt, the Great Wall of China, and the Cape Coast and Elima Castles where Africans were transported into slavery. This can help students understand historical events' physical and cultural context and develop empathy for different cultures.

Secondly, examining historical artefacts: virtual field trips allow students to explore historical artefacts in detail. For example, students can virtually investigate the Smithsonian's National Museum of American History, the British Museum, or the museum of their country of origin. Lastly, Virtual field trips can also help students understand historical events. This can help students understand historical events and their context. For instance, students can explore the battlefields of the American Civil War and areas in Africa where slaves were transported to Europe and the Americas during the slave period. Through this, students can understand the sequence of events, causes and effects, and the context in which they occurred. Finally, virtual field trips promote engagement and curiosity in students. By allowing students to explore historical sites and artefacts in an interactive and immersive way, virtual field trips can help students develop a more profound interest in history and a desire to learn more. Virtual

field trips can be valuable in History teaching as they provide new and interactive ways for students to explore historical events and perspectives.

Digital storytelling: Digital storytelling is a powerful tool for history instruction as it allows students to create multimedia presentations that combine text, image, audio, and video to tell a historical story (Robin, 2008). During instruction, history teachers can use digital storytelling for the following reasons or purposes:

A. Personal connection: Digital storytelling can help students connect to historical events. Through the creation of digital storytelling by history teachers, students can explore their family history, cultural heritage, or personal experiences related to historical events.

B. Research and analysis: Digital storytelling can enable history students to develop research and analytical skills. By researching historical events, primary sources, and other materials, students can create a digital story demonstrating their understanding of historical events and their importance.

C. Empathy and understanding: Digital storytelling can promote empathy and understanding of different perspectives and cultures. By creating a digital story from the perspective of a historical figure or a person from a different culture, students can develop a deeper understanding of historical events and their impact on other people. In conclusion, these technological tools are essential in the teaching of history. They provide access to various historical resources, facilitate engaging learning experiences, and

help students develop critical thinking skills. As such, they are an essential component of any effective history curriculum.

Webquests are effective tools for teaching history, providing students with an interactive and engaging learning experience. History teachers can utilize Webquests in the teaching of history for the following reasons: Webquests enable both teachers and students to explore a wide range of online sources, such as secondary and primary documents, multimedia content, and scholarly articles. This allows teachers and students to access much information to enhance their comprehension of historical events, concepts, and figures.

Furthermore, Webquests promote critical thinking skills in students. Webquests require students to evaluate and analyze information from various sources, enabling them to develop critical thinking skills. Through this, they can assess the bias and reliability of different online sites, make informed judgments about historical interpretations, and distinguish between secondary and primary sources. Also, Webquests can promote activity by engaging students in meaningful activities and tasks. When students use them, they are tasked with analysing, interpreting, and synthesising information from multiple sources, fostering critical thinking skills.

Lastly, Webquests help students connect historical events and the world they live in today. By exploring the impact of past events on current issues and trends, students develop a deeper understanding of the relevance and significance of history in their lives.

Empirical Review

This part of the chapter is dedicated to discussing relevant research that has been done on the topic at hand. This is crucial to the study because it would serve as a benchmark for future comparisons. The research questions which have been developed for this research have been taken into consideration in the organization of the empirical review.

Technological Knowledge of History Instructors

Apua (2016) conducted a research study at the University of Cape Coast, Ghana which evaluated pre-service instructors' TPACK readiness. A simple random stratified sampling method was utilized in selecting 370 pre-service instructors for the study. The data collection process used a modified version of the questionnaire. Frequencies and percentages and the independent t-test were utilized to analyse the data generated. Findings from the study disclosed that pre-service instructors had technological knowledge. Also, findings from the study revealed that the pre-service instructors could install new programs on their computers which they intend to use, and produce presentations utilizing technological PowerPoint materials. Almost all teachers think they possess the skills necessary for learning technology. Additionally, findings from the research also revealed that the pre-service instructors are knowledgeable about the various technology forms, further supporting their acceptance of it. They also concurred that they could download images from websites to their computer's hard drives and send emails with attached files. On the other hand, the respondents expressed

uncertainty about their knowledge and expertise in using technology to deal with the challenges they encountered.

The results of Apua's (2016) study revealed that pre-service instructors possessed high TK levels, thus ensuring that they could improve their instruction with the help of technology. This supposes that an overwhelming percentage of pre-service instructors can navigate the 21st-century classroom with said knowledge. These findings also imply that pre-service instructors may have a technological bent that can influence their instruction. Technology can be incorporated into the teaching process by instructors with a working knowledge of it. Because of this, both pre-and in-service instructors can develop technology plans that will help them understand and learn using rapidly changing innovations.

Similarly, Afari-Yankson (2022) conducted a study on Christian Religious Studies Instructors in Ghana. The study utilized a convergent mixed-method research design. 72 Christian Religious Studies instructors participated in the research in their last year of studies, and the survey approach was employed. Information needed to conduct the research was gathered using an observational guide and questionnaire. Frequencies, percentages, means, and standard deviation were analyzed in the data collected. The study results disclosed an average mean of CRS Instructors TK of 4.18 and SD of 0.78 indicating that Christian Religious Studies instructors have technological knowledge. Findings from the study also showed that the CRS instructors were proficient in using cutting-edge technology and instructional resources for teaching and learning CRS content. Moreover,

findings from the study also indicated that CRS instructors were competent in utilizing novel technology and knowledgeable about diverse technological methods in teaching CRS content. However, although Christian Religious Studies instructors claimed to be technologically literate, it was found that they did not apply their claimed expertise. Findings from the observation checklist indicated that Christian Religious Studies instructors did not utilize audio-visual materials during instructions on CRS contents.

Mengual-Andrés, Quinto-Medrano, and Roig-Vila (2015) conducted a study in Spain to examine the TPACK expertise primary school instructors need to incorporate ICTs into their lessons. To achieve this, 224 instructors, using a quantitative approach participated in the research study. The study results indicated that instructors have greater expertise in teaching methods and subject matter unlike educational technologies, which suggests that they do not have sufficient knowledge of information technology and how to incorporate it into instruction effectively. Moreover, the study also revealed that instructors have low confidence in their technological problem-solving abilities (M= 2.69; SD=1.20) and likewise, they do not believe they are knowledgeable about various technological components (M=2.76; SD=1.11).

The findings from Mengual-Andrés, Quinto-Medrano, and Roig-Vila's (2015) study imply that regardless of the location of an instructor, his or her belief in utilizing technology depends on his or her mindset and view of using technology during learning and teaching. According to Gulbahar and Guven (2008), the mindsets and views of instructors are key indicators of their usage of

novel technology in a learning environment. They further claimed that these mindsets regarding technology impact both the experiences of instructors and the experiences of the pupils they teach. The effectiveness of a specific technology and the degree to which it is incorporated into the teaching and learning process is significantly influenced by the mindsets instructors or consumers have regarding it (Zhao, 2007). This suggests that without support and dedication to employing technology, the incorporation of technology into the school is unlikely to be successful (Zhao, 2007).

In a study, Adeoye and Ojo (2014) analysed the perceptions of future teachers' technological pedagogical content knowledge at several colleges in Lagos, Nigeria. The methodology used in the study was a descriptive survey. The questionnaire, developed based on the work of Schmidt et al. (2009), was the instrument used to collect information from respondents. The study's population comprised four hundred student-teachers and nine Nigerian colleges of education in the 2013/ 2014 academic school year. A stratified sample random sampling method was used to select 264 student-teachers and four colleges from the original population of 400 students and nine institutions for the data collection. Findings showed that half of the student-teachers in the study had limited technological literacy but were open to learning more. Half of them had some understanding of technology that could be applied to their specific fields of study.

Technological Pedagogical Knowledge of History Instructors

Afari-Yankson (2022) conducted a study on Christian Religious Studies Instructors in Ghana. The study utilized a convergent mixed-method research

design. 72 CRS instructors in their last year of studies participated in the research and the survey approach was utilized. Information needed to conduct the research was gathered using an observational guide and questionnaire. Frequencies, percentages, means, and standard deviation were used to analyze the data collected. An average mean of 3.92 and a standard deviation of 0.82 were obtained from the findings regarding the TPK of CRS instructors. This indicates that most of the CRS instructors consented to the various questions they were asked. The instructors' technological pedagogical knowledge in teaching Christian Religious Studies was sufficient. This is evident from the instructors' ability to utilize technologies that improve teaching methods for CRS lessons, enhance pupils' learning of CRS lessons through technology, use technology to connect Biblical text to real-life situations during CRS lessons, and facilitate students' collaboration through technology. Additionally, the instructors ensured that their pupils conducted group presentations utilizing technologies and were mindful of how these technologies could impact their instructional approaches in the classroom. However, the instructors were unsure whether they utilized technology to evaluate their pupils' learning. One significance of 21st-century classroom instruction is creating an enjoyable learning atmosphere for students which is a key component of high-quality instruction and learning. Indeed, if technology aids in ensuring this high level of teaching effectiveness, then instructors need to be proficient in using technology in the learning environment.

Also, Owusu (2014) found that in-service instructors were further prepared to utilize technologies to improve their instructional techniques and

involve pupils in learning and instruction. According to the study, instructors can select technology that improves their lesson plans and their pupils' conceptual understanding. Moreover, instructors can supervise a technology-rich learning environment, choose technologies suitable for the way they teach, apply them to various instructional tasks, use them to evaluate pupils' progress, and even actively involve pupils in the process of learning and instruction. This implies that both employed and future instructors must be capable of using technology to improve their instructional tasks.

Tinmaz (2004) evaluated the technology aspiring teachers use in Turkey in light of their subject matter. According to the study, teachers in training typically graduate with a minimum of an average level of technology teaching competency. As can be seen, Tinmaz used teachers in training and came to a different conclusion than Owusu (2014), who used currently employed instructors and discovered they had technological pedagogical knowledge. It doesn't seem clear whether or not teachers in training are versed in technological pedagogy knowledge.

A study by Apua (2016) discovered that pre-service instructors lack technological pedagogical knowledge. An average score of 2.13 with a standard deviation of 1.23 suggests that pre-service instructors lacked knowledge of incorporating technology in teaching their respective subjects. Additionally, results indicate that nearly all of the pre-service instructors (M = 2.09, SD = 1.11) said they could not create lessons that effectively blended their subject area, technology, and methods of instruction. Furthermore, an average score of 2.11

with a standard deviation of 1.21 indicates that the pre-service instructors were unaware of the various technologies available to enhance the comprehension of particular concepts in their subject.

Technological Content Knowledge of History Instructors

A study was conducted by Yalley (2016) to investigate the technological pedagogical content knowledge of Social Studies instructors in the Ashanti Region of Ghana's Kumasi Metropolis Senior High Schools. The population of the study consisted of all 136 Social Studies instructors employed at the nineteen public Secondary High Schools located within the Kumasi Metropolis. Descriptive and inferential statistics were utilized to analyse data gathered from the respondents. Results from the findings of this study indicate a mean score of (M = 4.10; SD = 0.80) which suggests that the social studies instructors concur that they have TCK required for social studies teaching. Additionally, a mean of 3.88 and a Standard Deviation of 0.91 indicate that Social Studies instructors concur that they can alter lessons about social studies by utilizing technological resources. They can use the World Wide Web to search for contents of Social Studies. Additionally, the teachers agreed they could use technological representations to illustrate particular concepts in Social Studies such as multimedia and visual representations.

On the contrary, the findings from Mengual-Andrés, Quinto-Medrano, & Roig-Vila (2015) revealed that primary school teachers in Spain lack TCK with an average mean of (M=3.59) and a mean of SD of (0.95). The study findings also indicate that instructors had varying opinions on staying current with significant

new technologies and having sufficient chances to interact with various components of technology during instruction. Finally, they also did not believe they had a lot of understanding of different technological components (M= 2.76; SD=1.11).

Apua (2016) also corroborated Mengual-Andrés, Quinto-Medrano, and Roig-Vila's (2015) study, revealing that student- instructors at the University of Cape Coast, Ghana, lack technological content knowledge. Findings from the study indicated that most pre-service teachers (M = 2.13, SD = 1.23) admitted they were clueless about how technology could be utilized for presenting the content they were teaching. Additionally, the vast majority of respondents (M = 2.11, SD = 1.21) admitted ignorance regarding technology that might be used to learn particular topics within their field of study. These findings from Apau (2016) also suggest that the pre-service teachers' technological content knowledge was low and were only accustomed to conventional instruction.

Technological Pedagogical Content Knowledge of History Instructors

In his study on teachers' perceptions of their pre-employment educational program, Smith (2012) discovered that instructors in preparation for teaching had multiple chances throughout their training courses to watch faculty members use technology in various instructional approaches. Results from the study also showed that the respondents could incorporate various forms of technology into their lessons because they had received training in their use during their pre-service teacher preparation programs. It was further discovered that different instructors had been enhancing their teaching methods with technology, including

videos, internet sites, computer programs for presentations, and online access to knowledge.

Yalley (2016) also reveals that Social Studies instructors approved they could articulate and develop the content of Social Studies that incorporates technology and makes it understandable to pupils. They can also help other people manage the content's use, instruction approaches, and technology at learning institutions. Also, an average score of 3.94, 3.86, and 3.86 with a Standard deviation of 1.03, 1.16, and 1.10 showed that teachers in the Social Studies field consented they can teach subjects that are "inherently technological," thus "bettering" those subjects; they have the technical abilities to combine Social Studies curriculum understanding with technology to deliver successful teaching; and they can utilize technological tools to widen conversations in the classroom outside the walls of the classroom.

Additionally, an average score of 4.00, with a standard deviation of 0.97 was revealed, which indicates that social studies instructors concurred that they have the technological pedagogical content knowledge required for social studies instructions. The findings of Yalley (2016) also back the assertion that effective technology integration requires teachers to be proficient in three areas: technology, technology-supported instructional design, and technology-related management of the classroom, as emphasized by Education Technology Research Development (2007).

Byker (2014) conducted a study in the United States on the need for TPACK without being aware of it. The study aimed to describe how a lesson

utilizing pedagogical technology could be incorporated into an elementary-level course on social studies methods. First, according to the study, pre-service instructors see a growing need for technological expertise in their subsequent professions as teachers. Second, the study discovered that although many pre-service instructors believed technology helpful in the classroom, they were uncertain how it should be used. It could be inferred that, when the study was performed, the pre-service instructors were not sufficiently trained to incorporate technology, content, and pedagogy in classroom instruction. This is likely why the study's findings that the pre-service instructors were perplexed regarding the different approaches they could use to incorporate their technological comprehension and their knowledge of the content of and methods of instruction.

Apua's (2016) research findings also revealed teachers lack technological pedagogical content knowledge. Apua's findings show that almost all of the future teachers of DASSE (M = 2.09, SD = 1.11) said they could not create lessons that effectively blended their subject area, technology, and methods of instruction. In addition, the overwhelming majority of the future teachers (M = 1.97, SD = 1.14) said they could not use technology during instruction to improve the content taught, how they taught it, and the way their pupils learned. Additionally, they implied that they could not identify and employ online resources that successfully illustrated a particular concept in their field of study. Moreover, the findings also revealed that they were unable to use technology to support scientific research in class and that they failed to employ technology to accurately convey content that deviated from the traditional method of textbooks.

These findings from Apua (2016) indicate the low state of the pre-service teachers' technological pedagogical content knowledge which would obstruct successful instruction in these 21st-century educational settings (Guzey & Roehrig, 2009).

While some studies assert that instructors use TPACK, others contest this assertion. As a result of this research, the quest for instructors' TPACK continues. For example, Alademerin and Garba (2014) investigated how ready Nigerian educational institutions were to prepare pre-service instructors for incorporating technology. The researchers discovered that since the lesson content was less practical but more theoretical, it incorporated technology and instructional procedures very little. It can be inferred that since their teacher preparation program only emphasizes the combination of instructional methods and subject matter in instruction, pre-service instructors would be unable to successfully integrate the three aspects of teaching (subject matter, instructional method, and technology).

A study on pre-service instructors' TPACK was carried out in the USA by Lee, Smith, and Bos (2014). The study sought to understand better the idea of integrating technology to encourage effective instruction. The study results revealed that the participants' opinions of their utilization of technology were favourable. Regarding their aptitude for carrying out broader capabilities, such as "utilizing technology for practical problem solving," "debating moral problems," and "speaking about technology diversity matters," 30% had impartial opinions. The research findings also revealed that the participants were interested in using

technology in the classroom due to its appealing qualities and were not concerned with the lesson plan or learning objectives. The study also discovered a correlation between the students' conceptual mastery of the instructional procedure and the suitability associated with their technological tool preference. According to the literature, prospective teachers within the so-called "developed nations" are better equipped than their peers in the so-called "developed nations." regarding integrating technology, instructional procedure, and subject matter. Instructors are now able to relocate from one location to another as a result of globalization. As a result, every teacher must consider the current technological trends in 21st-century classroom settings.

Quinto-Medrano, Mengual-Andrés, and Roig-Vila (2015) conducted a study in Spain to examine the TPACK expertise primary school instructors need to incorporate ICTs into their lessons. According to the study, instructors were more proficient in non-technology-related TPACK model parts such as subject matter expertise, teaching skills, and the intersection thereof. Regarding the TPACK constructs, the teachers lacked knowledge of the framework technology-related constructs: TK, TCK, TPK, and TPACK. The assumption among teachers was that they lacked the technical problem-solving skills and depth of knowledge required to understand various technological components. Additionally, the teachers' views on staying current with relevant emerging technologies also differed particularly regarding utilizing technology for amusement and having enough chances to work with various technology components. This may be because the teachers were not exposed to or interested in using technology to its

full potential. As a result, the study found that teachers seemed unsure of the best ways to incorporate instructional methods, content, and technology in the teaching environment. As a result, there is a desire to learn from Liberian history instructors about their knowledge of TPACK and its use in the classroom.

Gender of History Instructors and TPACK Level

Due to its origins as a word for tools and instruments, technology is stereotypically associated with men. According to Daker, Dow, and McNamee, as cited in Savas (2011), its origins can be traced back to the Greek word "tekne," which is equivalent to the English phrase "wood maker". In light of this, researchers have been curious to learn whether the utilization of technology is influenced by gender (Jang & Tsai, 2012; Lin, Tsai, Chai & Lee, 2013; Gomez-Trigueros, Yanez de Aldecoa, 2021).

Karaca (2015) examined the TPACK of teachers in pre-service by considering several factors. The study's findings revealed a substantial disparity between the test results of the average mean score of 125.4 with a standard deviation for the male pre-service teachers and female teachers in pre-service with an average mean score of 132.5 and a standard deviation of 15.1 and a p-value of 0.01 respectively. This finding also showed that the instructors in training TPACK varied depending on their gender and that female teachers in pre-service had higher TPACK scores than their male counterparts. Inferentially, male instructors employ technology to a greater extent than female teachers. Therefore, it is essential to expose teachers of both sexes equally to technology and how it can enhance instruction. As a result of this, both men and women teachers would

be sufficiently prepared to meet the requirements for a 21st-century learning environment.

Additionally, Mengual-Andrés, Quinto-Medrano, and Roig-Vila (2015) discovered substantial disparities in all technology-related knowledge areas for both males and females. An average mean score of 3.56 with a standard deviation of 0.75 was reported for the Technological Knowledge of males, whereas for females an average mean score of 3.07 with a standard deviation of .90, and t (222) = 3.023, p=0.002 were reported. Regarding the Technological Content Knowledge level for males, an average mean score of 3.90 with a standard deviation of 0.86, and for female teachers an average mean score of 3.52 with a Standard deviation of 0.96 as well as t (222) =2,320, p=0.021were reported. Furthermore, regarding the TPACK level of men an average mean score of 3.72 with a standard deviation of 0.84, and for women an average mean score of 3.38 and a standard deviation of 0.98 and t (222) = 2.043, p=0.042 were reported. To ensure that both men and women are equally equipped to use technology in the classroom, educational institutions and education ministries in various nations must strongly emphasise innovative training programs that could help close the disparity between men and women concerning using technology.

Qualification of History Instructors and TPACK Level

Mailizar, Hidayat, and Artika (2021) conducted a study in Indonesia on the impact of demographic factors on mathematics instructors' TPACK. The study aimed to assess the TPACK of Indonesian math instructors and determine whether there are any significant disparities in TPACK levels in terms of gender, teaching

experience, school level, and teacher educational qualification. Findings from the study revealed substantial differences in teacher qualification (master's degrees and bachelor's degrees) in TPACK across the technological constructs. The results of the study revealed that bachelor's degree instructors TK (M=4.0062) and master's degree (M=4.255) with a sig value in TK (.002). It was also revealed that both bachelor and master teachers' TPK Means scores were (4.0758, 4.2898, sig.011). Findings from the study revealed the TCK construct level of both bachelor and master teachers (M= 4.0199, 4.3265 sig.000). The TPACK construct revealed teachers with bachelor and master qualifications having (M= 3.9731, 4.2449, Sig.004). This demonstrates that master's degree instructors possess a greater level of the technological constructs of the TPACK paradigm than instructors with bachelor's degrees. According to Anthony, Subali, Pradana, Hapsari, and Astuli (2019), instructors who have extra training produce pupils who have better accomplishments. This was also corroborated by Goldhaber and Brewer (2000) and Zuzovsky (2009), who opined that instructor with a higher level of education shows a positive relationship with pupils' educational achievement. However, according to Rivkin et al. as cited by Anthony et al. (2019), established that there is no substantial indication that master's degrees improve the efficacy of instructors at the senior high school level. In addition, findings from Kimani, Kara, and Njagi (2013), concurred with the assertion that an extra professional level of education separate from the bachelor's degree level does not lead to improved instructional proficiency at the senior high school level.

Teaching Experience of History Instructors and TPACK Level

Teaching experience is the practical knowledge, skills, and expertise gained by a teacher through the process of instructing and guiding students in an academic environment. It involves the development and delivery of subject content, evaluation of the progress of learners, as well as provision of support and feedback to enable learning.

A study conducted by Nazari, Nafissi, Etaji, and Marandi (2019) focused on assessing the perceived TPACK and professional development of inexperienced and experienced EFL instructors. Findings from the study show that experience instructors' scores were significantly higher in the constructs of TPACK that have to do with (CK, PK, and PCK). According to Hervey (2015), when instructors have abundant knowledge of the subject matter and instructional approaches, it is due to the many years that they have spent in the classroom, which thus indicates the proficiency of these teachers in the areas of instructional methods and subject matter but a limitation when it comes to technological knowledge.

But in contrast, the scores of inexperienced instructors were significantly higher in the TPACK constructs that have to do with technology (TK, TPK, TCK, and TPACK). According to Hsu, Tsai, Chang, and Liang (2017), inexperienced instructors take advantage of their knowledge of technology in classroom instruction. Although inexperienced, these teachers according to Prensky (2001) are referred to as digital natives.

Age of History Instructors and TPACK Level

A study by Cetin-Berber and Erdem (2015) examines Turkish teachers in training technological pedagogical content knowledge. A regression analysis was used to determine the impact of technological, pedagogical, and content knowledge on the development of the teachers in training TPACK. Four hundred ninety-one instructors in training who attended Pamukkale University for the summer semester were included in this study as respondents. Findings from the study show no appreciable variations in age and the development of teachers' TPACK. This also implies that age does not play a significant role in the TPACK beliefs about future teachers in training. A study by Koh and Chai (2011) also corroborated this finding when they conducted a study on Singaporean pre-service teachers' TPACK beliefs of the seven constructs. The study employs a multi-step regression model to examine how factors like participants' ages, sex, and the various components of TPACK affect the participants' views on TPACK. Findings from the study revealed that age had no statistically significant difference in the analysis.

Chapter Summary

The purpose of this research was to assess History instructors' technological, and pedagogical content knowledge in the senior high schools in Montserrado County Educational District 1B, Liberia. The theoretical TPACK paradigm of Mishra and Koehler (2006) presents an accurate model to guide the usage of ICT in History learning and instruction. Teachers must tackle the issues of technology, content, and pedagogy concomitantly if they are to remain

effective. Integrating these knowledge bases can create a cross-section of three imbrication circles of the bodies of knowledge. The focus of the "convoluted interchange" is at the centre of these bodies of knowledge (technological knowledge, content knowledge, and pedagogical knowledge. The intersection named technology that include the teachers TPACK. Smith (2012) discovered that instructors in preparation for teaching had multiple chances throughout their training courses to watch faculty members use technology in various instructional approaches. Yalley (2016) and Apua's (2016) research findings also revealed teachers lack technological pedagogical content knowledge. The review shows that teachers across the globe have varying level of TPACK. Thus, some teachers have low level while others also have theirs to be high. Various sources indicate that Liberia is untouched with issues of TPACK.

CHAPTER THREE

RESEARCH METHODS

Overview

This chapter of the study focused on the procedures used in conducting the study. It comprised the research paradigm, research approach, research design, study area, population, data collection tool, data collection procedure, and data analysis.

Research Paradigm

The positivist's paradigm is the foundation on which this study stands. They support strong objectivity, focusing on the neutrality of the knower and that knowledge resides outside and apart from the knower. Many social scientists are positivists (Creswell, 2014). The purpose of this research was to assess History instructors' technological, and pedagogical content knowledge in the senior high schools in Montserrado County Educational District 1B, Liberia. They use the same scientific method that is the strength of the physical sciences. That is, they hypothesize, operationalize, observe and record events, and analysed. In social science, the natures and laws of both social phenomena and of the stimulus-response concomitant relationships that tie such phenomena together can be reduced to the same basic underlying elements to be studied and assessed through cause-and-effect relationships. Positivists assume that there exists one objective reality that can be observed and described accurately. They believe that this reality is independent of individual perspectives. This study aims to establish levels and test hypotheses through statistical means and standard deviation. The

study intends to establish History teachers' level of TK, TCK, TP and TPCK of History teachers as well as find out the effect of the teachers' gender, age, academic qualification and their teaching experience on their use of TPCK.

Research Approach

A quantitative research approach was used in conducting this study. According to Creswell (2009), quantitative research is an approach that evaluates unbiased theories by looking at the connections between the variables in question. Moreover, the variables in question can be measured using various tools, and the resulting numerical data is analysed using statistical analysis. Additionally, he posited that this type of research is predicated on the idea that theories can be tested logically, that bias can be eliminated, that alternative explanations can be controlled for, and that the results can be generalised and replicated. According to Eyisi (2016), there are several advantages to the use of a quantitative research approach. The researcher sought to utilize the quantitative research approach for this study for the following reasons:

- ✓ The quantitative research approach provides a systematic and structured way to collect and analysed data, allowing for more objective and generalizable findings.
- ✓ In addition, a quantitative research approach can enhance the credibility and rigor of a study. The reliance on objective data and statistical analysis helps to establish the validity and reliability of the findings.

Research Design

The descriptive survey cross-sectional survey design was used in conducting this study. The current chapter examines in depth the logic and principles of cross-sectional study design and presents practical examples to demonstrate the skills required for these surveys using different methods for the acquisition of study materials. The design and page layout of the chapter is similar to the chapter planning and conducting cross-sectional surveys, similar numbering is used to ensure content consistency. According to Ihudiebube-Splendor and Chikeme (2020) using a descriptive cross-sessional survey is critical to this research, given that it provides information for describing the state of a phenomenon or the connections between phenomena at a specific moment. Additionally, the descriptive survey enables the researcher to learn important information about the problem's existing state concerning the parameters being considered (Frankel & Wallen, 2003). The cross-sectional design was adopted for this study because it offers a quick, and efficient way to gather data, compare groups, estimate prevalence, and generate a hypothesis.

However, Fraenkel and Wallen (2000) established what they refer to as "the triple challenge" when employing a descriptive survey. They posit that the researcher must ensure the questions are straightforward and not deceptive. Second, the researcher must overcome the obstacle of persuading individuals to respond to the questions as purposefully and forthrightly as necessary; also, a significant quantity of questionnaires must be completed and returned to conduct useful analyses. To address these constraints, the questionnaires were pilot-tested

to identify and address issues that may have been ignored. Furthermore, the researcher gave the participants a clear explanation of the study's primary academic goals. Lastly, the researcher personally distributed the questionnaires to all History instructors currently teaching in Montserrado County Educational District 1B secondary schools.

Study Area

Montserrado County is located in the northwest corner of the West African country of Liberia, and it is home to the country's capital, Monrovia. It's one of the country's 15 "first-level" counties and consists of 17 "sub-political districts. According to the 2008 national census results, the county has a population of 1,118,241, making it the country's most populous county (Lisgis, 2008). In terms of land area, the county is the smallest in the country, with a total of 1,912.7 square kilometers (738.5 square miles), and Bensonville is its seat of government.

The County shares boundaries with three other counties. The county's western border is Bomi County, and its southern border is the Atlantic Ocean. Margibi County is to the east, and Bong County is to the north. Furthermore, the soils of the land are mostly clay-based alluvial soils that were transported to the sea by interior valley streams and rivers. Palm trees, mangrove forests, and savanna grasslands are found in the coastal lowlands; tropical forests cover the interior hills and valleys. St. Paul, Mesurado, Du, and Po are a few of the rivers in the county (Montserrado County Development Agenda, 2008). Additionally, because of its long history, Montserrado County can claim to be almost as old as

the West African nation itself. In 1821, under the direction of the ACS, free African Americans settled on Providence Island, located on the Mesurrado River in the center of modern-day Monrovia. Of the three counties that signed the Declaration of Independence of Liberia on the 26 of July 1847, Montserrado County was the first signatory to this historical document.

A few settlements that were named after the freed slaves who came from America during the colonial period were: Brewerville, Royesville, Careysburg, Harrisburg, Virginia, Caldwell, and Garnerville. Initially, Gibi, Marshall, and Bomi served as the County's administrative regions. However, in 1985, under the leadership of President Samuel K. Doe, Gibi and Marshall combined to establish Margibi County, and in the same year, Bomi was also given county status. The current configuration of Montserrado County consists of 21 townships, seven cities, one borough, two chiefdoms, and two statutory districts. In 1949, President Tubman was responsible for appointing the first County Inspector, who was tasked with managing the administrative tasks of the County. The county's chief administrative officer is a superintendent, and in 1973, President Tolbert appointed the first superintendent of the county. Refer to Figure 2 for the pictorial representation of the county.

Figure 2: A pictorial representation of Montserrado Educational District

Montserrado Educational District 1B is located in Gardnerville, one of the townships in Montserrado County, where this research study was conducted. It comprises approximately 150 schools, including early childhood, primary, junior, and senior high schools. There are 25 senior high schools within Educational District Left Bank 1B, of which Mr. Jollie Kollie serves as District Education Officer.

Population

The population of this study comprised all senior high school history teachers within Montserrado County Educational District 1B, Liberia. Montserrado County Educational District 1B consists of 25 senior high schools with 85 history teachers.

Table 1: Distribution of the Population of History Teachers

Senior High Schools	Number of History Teachers
Bishop Albert D. Miller	2
Bishop Grimley	1
Bishop Peter Jarkley	3
Bishop Tue Institute	2
Christian Faith Community	2
Dujar	3
Elizabeth Gedi Garwo UMS	2
Emily Sweet School of Excellence	2
Esther B. Davies	3
Freeway Baptist	4
Grace A.G.M	4
Haweh Academy	3
James K. Chelley	4
Jennie	4
Jimmy Jolocon	5
Joel	3
Kula Memorial Academy	5
Salvation Army	4
Sarah Doe Memorial Academy	4
Seventh-Day Adventist (SDA)	6
St. Micheal Catholic School	4
St. Philips Ecumenical	3
UHP Evangelical	3
Wariebi Academy	3
William G. Kpolleh	6
Total	**85**

Source: Field Survey (2023)

Participants

The study made use of all the 85 History teachers in the Montserrado County Educational District 1B, Liberia through the census method. All the history instructors were involved in the study because the number, 85, was not large enough to warrant selection. This approach was selected due to the involvement of all the respondents in this study and the limitation in the population size. According to Afari-Yankson (2022), a census survey entails gathering data on every member of a particular population. Additionally, a census survey is usually conducted to estimate the population and analyse statistics. The accuracy of a census survey is a major benefit compared to other survey methods. Because participants in census surveys are part of a specific population, the information obtained will be more trustworthy and precise than the information obtained through a sampling survey.

On the other hand, census surveys are widely regarded as the ones that require the most time and are also the most strenuous physically compared to the different types of surveys. For instance, in contrast to a sampling survey, which only needs data from a subset of the population, a census survey needs statistics from the entire population. On the contrary, the cost of conducting a census survey is typically higher than other surveys since the researcher will frequently travel to collect data.

Data Collection Instrument

The questionnaire was the primary tool used to assess History instructors' technological pedagogical content knowledge in Montserrado County Educational

District 1 B senior high schools. The questionnaire was modified from Nordin (2014) Chai, Ng, Li, Hong, and Koh (2014), Chai, Koh, and Tsai (2010), and Schmidt et al. (2009) and Graham, Burgoyne, Cantrell, Smith, Clair, Harris (2009). This instrument was preferable because of its dependability and validity. The modification by the researcher had to be his addition to make the six items 14 to the technological knowledge to match the Liberian Situation. On the technological pedagogical knowledge five items were increased to fourteen. Five items on TCK were increased to six and five items in the adapted instruments were increased to nine items. Punch, referenced in Owusu (2014), suggested that it would be feasible to use a current data collection instrument if one is available for a multifaceted and complicated variable, thus indicating the adaptation of this instrument.

The questionnaire has five-point Likert Scales ranging from Uncertain = UC, Completely Disagree = CD, Disagree =D, Agree= A, and Totally Agree= TA. The recommendation of McKelvie, as cited in Owusu (2014), that the five-point scale proves more dependable as opposed to the other scales, informed the decision of the researcher to employ the five-point Likert scale. In addition, a Likert scale with five points was used in the vast majority of TPACK questionnaires, particularly those that were utilized as a template for the current study.

The questionnaire was divided into five sections. The 1st section of the questionnaire dealt with the personal information of the participants. The 2nd section focused on History teachers' technological knowledge (TK). The 3rd

section dealt with history teachers' technological content knowledge (TCK), the 4th section concentrated on history instructors' Technological Pedagogical Knowledge (TPK), and finally, section five (5) focused purposefully on history instructors' Technological Pedagogical Content Knowledge (TPCK).

Validity and Reliability Test of the Instrument

Several validity and reliability tests were conducted on Chai, Ng, Li, Hong, and Koh (2013), Chai, Koh, and Tsai (2010), Schmidt et al. (2009), Nordin (2014), and Graham, Burgoyne, Cantrell, Smith, Clair, and Harris (2009), whose survey questionnaires were modified for this research. However, the researcher thought it crucial and expedient to ensure the study's instrument was accurate and trustworthy because the modified tools had been utilised in the United States, Singapore, and Asia. With the supervisors' input, the instrument was expanded to include items the supervisors deemed essential but not initially included but could reflect the Liberian situation. As recommended by Archambault and Crippen (2009), having specialists review the instrument guaranteed that the items were somewhat comprehensive, pertinent, and structured appropriately, leading to an excellent level of validity in terms of content.

A pilot test was conducted on the questionnaires with fifteen (15) History instructors in Montserrado County Educational District 2B. These teachers were used because they also teach History. Therefore, they are in a position to assess the instruments due to their expertise in the subject matter. The main goal of the pilot test was to confirm that the items were appropriate. A Cronbach Alpha value of 0 .954 was obtained from the pilot-tested instrument. According to George and

Mallery, as cited in Schrepp (2020), a Cronbach Alpha value greater than 0.70 is excellent. Emerson (2019) also weighs on this by stating that a higher value of Cronbach Alpha shows that items being evaluated correlate highly with each other. No adjustment was made to the pilot test instruments because they were not found to be deceptive.

Data Collection Procedures

The researcher his upon arrival went to the administration of the school to introduce himself and seek permission from the school's authority. The research was directed to meet with the history teachers in the various schools. To ensure that participants provided precise responses, the aim of the research was explained to the participants. The researcher clarified the statements on the questionnaire to them who were told that participating in the study was optional and they had the right to revoke their consent at any time. Eighty-five (85) questionnaires were given to History teachers in August 2023. The duration for the administering of the questionnaires was two weeks. Finally, out of the 85 questionnaires given to the participants, only 77 were received. This indicated a 91% return rate for the questionnaires given to the participants.

Data Processing and Analysis

In addressing the research questions framed to direct the study, data collected from the participants was cleaned to remove any irrelevant information before being coded to answer the research questions that were developed. After this, the data was processed utilizing SPSS version 25. The data collected were analyzed by inferential and descriptive statistical tools. The researcher used

Descriptive statistics (means, percentage, and standard deviation) to answer research questions 1-4. Independent Sample t-test was used to answer research hypothesis $H_{0:1,}$ and One-way ANOVA was used to answer research hypothesis 2-4 (H0:2 – $H0:_4$).

The researcher used means and standard deviation to answer the research questions one to four due to the measure of central tendency, which provides a representative data set value. Additionally, this enabled the researcher to draw meaningful conclusions and make informed decisions. An Independent Sample t-test on the first null hypothesis was utilized because it provided a clear comparison between the means of the group and thus established whether the difference was statistically significant. The researcher also used One-Way ANOVA to answer the null hypothesis two to four because this tool enabled the researcher to provide a statistical test in determining whether there existed any significant differences in the means between groups. Furthermore, One-way ANOVA allows for the simultaneous comparison of means across multiple groups.

Ethical Consideration

Approval to carry out the field work was sought from the University of Cape Coast. Again, permission was also obtained from the Ashanti regional Education Office and informed consent from the participants. All ethical issues in research were keen followed to ensure that no member had their rights trampled upon. The participants were not subjected to coercion or persuasion regarding obtaining information from them. To guarantee the privacy and anonymity of all

participants, participants were not compelled to provide their names, contact numbers, or any other information that might be connected to their true identities. They were treated with respect and honour. Questionnaires were carefully structured to avoid embarrassment or respondents have the right not to answer any part of the questionnaires if they consider it to have adverse effect on them. Very sensitive questions were eliminated.

CHAPTER FOUR

RESULTS AND DISCUSSION

Overview

The study assessed History teachers technological pedagogical content knowledge in the Senior High Schools of Montserrado County Educational District 1B, Liberia. The researcher used a structured questionnaire to collect the information required for the study from the instructors. The data analysis tools used included descriptive and inferential statistics. The first section of the discussion dealt with the demographic characteristics of teachers, while the subsequent sections focused on the level of history instructors' TK, TCK, TPK and TCPK. The results are presented and analysed based on the research questions and hypothesis that guided the study. For clarity and simplicity in reading, results have been presented in tables.

Demographic Characteristics of Respondents

This segment of the chapter focuses on the demographics of the participants (teachers). Table 2 shows the History instructors' characteristics in the Senior High Schools of Montserrado County educational District 1B, Liberia.

From Table 2, it was recorded that 63 (82.0%) of the respondents were males and 14 (18.0%) were females. This implies that male teachers dominated the teaching of history in the Senior High Schools of Montserrado County Educational District 1B, Liberia. Table 2 reported on the qualifications of History instructors.

Table 2: Demographic Characteristics of Respondents (n=77)

Variable	Subscale	Frequency	Percentage
Gender	Male	63	82.0
	Female	14	18.0
Age	Below 22 years	1	1.0
	22-27 years	13	17.0
	28-31 years	20	26.0
	32 years	43	56.0
Present Qualification	BSC in Education	19	24.7
	AA Certificate	24	31.2
	B Certificate	31	40.3
	C certificate	3	3.9
Teaching Experience	1-5 years	24	31.2
	5-10 years	18	23.4
	10-15 years	18	23.4
	15 years above	17	22.1

Source: Field Data (2023)

From Table 2, 19 (24.7%) of the teachers were BSC in Education certificate holders, whereas 24 (31.2%) were AA certificates. Again, 31 (40.3) of them possess a B Certificate in teaching, and three (3.9%) of them have obtained a "C" certificate for teaching History. This implies that 31 teachers with B Certificates, representing 40.3 percent, dominated history teaching in the District. Concerning the teachers' teaching experience, it was recorded that 24 (31.2%) of them have experienced between 1-5 years, whereas 18 (23.4%) and 18 (23.4%) fell between years of teaching experience of 5-10 years and 10-15 years respectively. It was observed again that 17 (22.1%) of the teachers are 15 years above. This shows that a majority of the instructors have taught between 1-5 years.

Main Results and Discussion

This section of the chapter presents the results and discussion of the collected data to find answers to the research questions and the hypotheses. Results from quantitative data are presented here to show History teachers' technological pedagogical content knowledge in the Senior High Schools of Montserrado County Educational District 1B, Liberia. The results are presented in tables that represent teachers' responses. It also displayed the results of the hypotheses tested as part of the study.

Research Question One: What is the level of TK of History teachers in the senior high schools of Montserrado County Educational District 1B?

This question sought to establish the level of History teachers' technological knowledge in the secondary schools of Montserrado County Educational District 1B. Data was collected from **77** teachers on their technological knowledge in teaching where they were asked to indicate their agreement or disagreement with specific statements made concerning their technological knowledge. Through fourteen (14) close-ended items on the questionnaire, the instructors were to select their most preferred views to specify their thoughts on each item on a scale of 1= Uncertain; 2 = Completely Disagree; 3=Disagree; 4 = Agree and 5 = Totally Agree. The mean score interval was interpreted as low knowledge =1.00- 2.32, moderate knowledge = 2.33- 3.66, and high level of knowledge = 3.67-5.0. Table 3 displays their responses technological knowledge.

Table 3 presents the results of History instructors' responses on their acquaintance of the technological knowledge for teaching history in the schools of Montserrado County Educational District. Majority (n= 42, 54.6%) of the instructors disagreed that they are capable of finding solutions to the difficulties experience when utilizing technology (M= 3.34, S.D = 1.25). Again, the instructors disagreed that they are equipped with the ability and skill to quickly master technology (M= 3.33, S.D = 1.28). A majority (n=37, 48.0%) disagreed that they have the requisite technical skills to utilize various forms of technology (M= 3.04, S.D = 1.28). It was recorded that majority (n=43, 56.0%) of them disagreed that they are knowledgeable and skilled in the usage of several kinds of social networks, including: (WhatsApp, Facebook, blogs, and Wiki) (M= 3.26, S.D = 1.53). It was recorded that majority of them disagreed that they can download and install the necessary software applications that they need (M= 3.27, S.D = 1.34). Here too, majority of the instructors disagreed that they can use basic computer equipment such as a printer, scanner, digital camera, projector, and interactive chalkboard (M= 3.13, S.D = 1.33).

Table 3: History Instructor's Technological Knowledge in Secondary Schools (n=77)

Statement	UC		CD/D		TA/A		Mean	SD
	No.	%	No.	%	No.	%		
I have the requisite technical skills to utilize various forms of technology.	15	19.5	25	31.5	37	48.0	3.04	1.28
I am equipped with the ability and skill to quickly master technology.	11	14.3	22	28	44	57	3.33	1.28
I am capable of finding solutions to the difficulties I experience when utilizing technology.	9	11.7	34	34.0	42	54.6	3.34	1.25
I am knowledgeable about various kinds of technology.	17	22.1	29	38.0	29	38.0	2.86	1.30
I can download and install the necessary software applications that I need.	12	15.6	23	30.0	42	45.0	3.27	1.34
I can use basic computer equipment such as a printer, scanner, digital camera, projector, and interactive chalkboard	13	16.9	28	36. 0	36	47. 0	3.13	1.33

Table 3: Continued

I am knowledgeable and skilled in the usage of several kinds of social networks, including: (WhatsApp, Facebook, blogs, and Wiki)	18	23.4	16	21.0	43	56.0	3.26	1.53
I am skilled in creating and editing videos.	19	24.7	33	43	25	33.5	2.73	1.31
I can develop my webpage.	15	19.5	31	32	31	32	3.01	1.29
I am able to download a file or picture from the internet and save it on my laptop.	12	15.6	23	30	42	55	3.29	1.36
I am skilled in the usage of common software applications such as Word documents, PowerPoint, and Excel during lesson presentations.	14	18.2	24	31	39	51.0	3.18	1.34
Using a word processing program, I can create a document that contains both text and images.	12	15.6	23	25.0	40	52.0	3.18	1.34
I am able to attach files to messages that I send through email.	11	14.3	27	35	39	50.7	3.17	1.29
I am capable of developing websites of my own.	15	19.5	30	39	32	41.5	2.95	1.29
Average							**3.12**	**1.32**

Source: Field Data (2023)

From the responses, 42(55%) out 77 disagreed that they are able to download a file or picture from the internet and save it on their laptop (M= 3.29, S.D = 1.36). It was seen that (51.0%) disagreed that they are skilled in the usage of common software applications such as Word documents, PowerPoint, and Excel during lesson presentations (M= 3.18, S.D = 1.34). Furthermore, it was seen that more than half of them 40 (52.0%) disagreed that they use a word processing program, they can create a document that contains both text and images (Mn= 3.18, S.D = 1.34). Finally, 39(50.7%) disagreed that they are able to attach files to messages that they send through email (M= 3.17, S.D = 1.29). Majority (n= 47, 51.5%) were either uncertain or disagreed that they can develop their webpages (M= 3.01, S.D = 1.29). Also, majority of the instructors disagreed that they are knowledgeable about various kinds of technology (M= 2.86, S.D = 1.30). as well as disagreed of being capable of developing websites of their own (Mn= 2.95, S.D = 1.29. It was discovered that most of the instructors disagreed that they are skilled in creating and editing videos (Mn= 2.73, S.D = 1.31).

It was further noticed that an average mean score of 3.12 (SD= 1.32) was obtained for most of the responses of the instructors that they have moderate level of technological knowledge in the secondary schools of Montserrado County Educational District 1B. This may be attributed to the fact that instructors in the area may have not been fully introduced to the use of technology when teaching history there. This finding contradicts Apua (2016) who found that pre-service instructors had technological knowledge and that the instructors could install a new program on their computer which they intend to use, and produce

presentations utilizing technological PowerPoint materials. It almost aligns with Afari-Yankson (2022) who also found that teachers did not apply their claimed expertise in utilising audio-visual materials during instructions on others subject's contents.

Again, Roig-Vila, Mengual-Andrés, and Quinto-Medrano (2015) in their study discovered that instructors have greater expertise in teaching methods and subject matter unlike educational technologies, which suggests that they do not have sufficient knowledge of information technology and how to effectively incorporate it into instruction. Moreover, the study also revealed that instructors have low confidence in their technological problem-solving abilities. The finding also corroborates Adeoye and Oyo (2014) who in their study discovered that half of the student-teachers in the study had limited technological literacy, but were open to learning more. Half of them had some understanding of technology that could be applied to their specific fields of study. Base on the authorities it can be said that history teachers lack technological knowledge when teaching.

Research Question Two: What is the level of TPK of History instructors in the senior high schools of Montserrado County Educational District 1B?

This research question wanted to discover level of History instructors' technological pedagogical knowledge in the secondary schools of Montserrado County Educational District 1B. It intended to find out whether instructors agreed or disagreed with certain claims made about their understanding of the technological pedagogical knowledge. Through fourteen (14) close-ended items on the questionnaire, the instructors were to select their most preferred views to

specify their thoughts on each item on a scale of 1= Uncertain; 2, = Completely Disagree; 3=Disagree; 4 = Agree and 5 = Totally Agree. The mean score interval was interpreted as low knowledge =1.00- 2.32, moderate knowledge = 2.33- 3.66, and high knowledge = 3.67-5.0.

Table 4 presents the results of History instructors' responses on their familiarity with the technological pedagogical knowledge for teaching history in the schools of Montserrado County Educational District. From Table 3, majority of the instructors were either uncertain (17, 22%) or disagreed (33, 43.0%) that they are capable of using technology that improves their instructional strategies for a given lesson (M=2.81, S.D = 1.32).

Majority of them again disagreed that they employ new technology to improve and increase student involvement in learning (M= 2.65, S.D = 1.34). However, majority of them agreed that they can make use of technologies that are suitable for the lessons they teach (M= 3.83, S.D = 1.27). It was seen again that majority of them disagreed that they are capable of integrating technology into a variety of teaching tasks (M= 2.66, S.D = 1.20). This shows that they encounter challenges in integrating technology in their teaching while a larger part of the instructors also indicated that they are skilled in using modern technology to evaluate learners in a variety of way (M= 2.64, S.D = 1.21).

Table 4: History Instructors' Technological Pedagogical Knowledge (n=77)

Statement	UC		CD/D		TA/A		Mean	S. D
	No	%	No	%	No	%		
I am capable of using technology that improves my instructional strategies for a given lesson.	17	22	33	43.0	27	35	2.81	1.32
I can employ new technology to improve and increase student involvement in learning.	20	26.0	36	47	21	27	2.65	1.34
I can make use of technologies that are suitable for the lessons I teach.	17	22.0	33	43.0	27	35.0	3.83	1.27
I am capable of integrating technology into a variety of teaching tasks.	16	20.8	41	53.0	20	26.0	2.66	1.20
I am skilled in using modern technology to evaluate learners in a variety of ways.	18	23.4	38	49.4	21	27.3	2.64	1.21
I can make my students more familiar with real-world situations by utilizing various forms of technology	21	27.3	34	44.4	22	28	2.69	1.29

Table 4: Continued

I am capable of helping my students track and plan their learning using technology.	18	23.4	40	52	19	25.0	2.58	1.20
I can guide my students through the process of building a variety of knowledge representations through the use of technology.	17	22.0	39	41.0	21	27.0	2.75	1.25
I am capable of using social media in my instruction.	10	13.0	30	39	37	48	3.17	1.25
I can facilitate my students working together utilizing technology.	22	28.6	30	39	25	32.5	2.68	1.31
I can employ new technology to improve and increase student involvement in learning.	22	29.0	35	35.0	20	26.0	2.53	1.19
I can enhance my communication and interaction with students by utilizing technology.	16	21.0	38	49.0	24	30.0	2.73	1.24
I can use technology for improving my approaches to teaching.	19	24.7	26	34.0	32	41.3	2.88	1.33
I can use various technologies to enhance how a lesson is presented to students.	25	32.5	25	33.0	27	35.1	2.60	1.33
Average							**2.80**	**1.27**

Source: Field Survey (2023)

From Table 4 again, majority of the instructors disagreed that they can make their students more familiar with real-world situations by utilizing various forms of technology (M= 2.69, S.D = 1.29). Most of them also disagreed that they are capable of helping their students track and plan their learning using technology (M= 2.58, S.D = 1.20). Majority of them also disagreed that they can guide their students through the process of building a variety of knowledge representations through the use of technology (M= 2.75, S.D = 1.25). It was seen that majority of them disagreed that they capable of using social media in my instruction (M= 3.17, S.D = 1.25). Again, majority of the instructors disagreed that they facilitate their students working together utilising technology (M= 2.68, S.D = 1.31). Majority of them disagreed that they can employ new technology to improve and increase student involvement in learning (M= 2.53, S.D = 1.19) and that they can enhance their communication and interaction with students by utilising technology (Mn= 2.73, S.D = 1.24). Furthermore, majority of the instructors disagreed that they can use technology for improving my approaches to teaching (M= 2.88, S.D = 1.33). Lastly, it was recorded that most of the instructors disagreed that they can use various technologies to enhance how a lesson is presented to students (M= 2.60, S.D = 1.33).

Most of the instructors disagreed with most of the statements that were presented to them which resulted with average mean= 2.80 and standard deviation = 1.27) indicating that most of the History instructors have moderate level of technological pedagogical knowledge in secondary schools of Montserrado County Educational District 1B. This may be attributed to the fact that teacher

training institutions have been not introduced to technology in the teaching of history in Liberia. This finding disproves Yalley (2016) who found that the social studies instructors concur that they have TPK required for social studies teaching. In that study, Social Studies instructors agree that they can alter lessons to be taught about social studies by utilising technological resources which is not the case in Montserrado County Educational District 1B.

The finding of also show that Roig-Vila, Mengual-Andrés, & Quinto-Medrano (2015) again in Spain lack TPK indicating that instructors had varying opinions on staying current with significant new technologies as well as in terms of having sufficient chances for interacting with various components of technology during instruction. Apua (2016) also corroborated the findings of Roig-Vila, Mengual -Andrés, & Quinto- Medrano, (2015) study, revealing that student- instructors at the University of Cape Coast, Ghana, lack technological pedagogical knowledge which is same at Montserrado County Educational District 1B. This finding from Apau (2016) also suggests that the pre-service teachers' technological pedagogical knowledge was low and were only accustomed to the conventional way of instruction. It can therefore be stated emphatically that history instructors in Montserrado County Educational District 1B based on their responses and the results obtained have moderate level of the technological pedagogical knowledge.

Research Question Three: What is the level of History instructors' technological content knowledge in the senior high schools of Montserrado County Educational District 1B?

This research question wanted to discover level of History instructors' technological content knowledge in secondary schools of Montserrado County Educational District 1B. It envisioned to find out whether the history instructors agreed or disagreed with certain claims made about their understanding of the technological content knowledge in the teaching and learning of history. Through six close-ended items on the questionnaire, the instructors were to select their most preferred views to specify their thoughts on each item on a scale of 1= Uncertain; 2, = Completely Disagree; 3=Disagree; 4 = Agree and 5 = Totally Agree. The mean score interval was interpreted as low knowledge =1.00- 2.32, moderate knowledge = 2.33- 3.66, and high knowledge = 3.67-5.0. Table 5 displays responses from History instructors on their technological pedagogical knowledge.

Table 5 presents the results of History instructor's responses on their technological pedagogical knowledge for teaching history in the schools of Montserrado County Educational District. Observing from Table 4, majority of the teachers disagreed that they are familiar with how contents in history can be presented through the utilization of various forms of technology (M = 2.68, SD = 1.4) though their views spread across other items. It was seen again that most of them disagreed that they are knowledgeable about the technologies they can use to better their understanding of particular contents in history (M = 2.91, SD = 1.35).

Table 5: History Instructor's Technological Content Knowledge in Secondary (n=77)

Statement	UC		D/ CD		TA/ A		M	SD
	No	%	No.	%	No.	%		
I am familiar with how contents in history can be presented through the utilization of various forms of technology.	22	28.6	28	36.3	27	35.1	2.68	1.41
I am knowledgeable about the technologies I can use to better my understanding of particular contents in history.	12	15.6	21	26.4	44	57.0	2.91	1.35
I am capable of using the world wide web to search for contents of history.	12	15.6	21	27.3	44	57.1	3.26	1.33
I am skilled in using relevant emerging technologies to present the contents of history (such as multimedia and simulation)	21	27.3	31	40.3	25	33.	2.65	1.29
I can use technological representations to illustrate particular concepts in history, such as multimedia, and visual representations.	21	27.3	34	44.1	22	28.6	2.66	1.31
I am knowledgeable about emerging technology in history education.	30	39.0	34	34.0	21	27.0	2.79	1.37
Average							**2.83**	**1.34**

Source: Field Survey (2023)

From Table 5 again, most of the teachers disagreed that they are capable of using the world wide web to search for contents of history (M = 3.26, S.D = 1.33). It was recorded that majority of the instructors disagreed that they can use technological representations to illustrate particular concepts in history, such as multimedia, and visual representations (M = 2.66, S.D = 1.31). They are skilled in using relevant emerging technologies to present the contents of history (such as multimedia and simulation) (M = 2.65, S.D = 1.29). It was seen again that most (64, 73.0%) of them disagreed that they are knowledgeable about emerging technology in history education (M = 2.79, S.D = 1.37).

An average score of 2.83 (SD = 1.34) was observed from the responses indicating that History instructors have moderate level of technological content knowledge in teaching history in secondary schools of Montserrado County Educational District 1B. This may be due to the fact that they were not entirely introduced to the use of technology during their training and hardly use some sophisticated technologies in their daily lives. This finding contradicts Afari-Yankson (2022) who indicated that the instructors in that study had adequate technological content knowledge in teaching CRS in Ghana, and used technologies that enhance students' learning of CRS lessons as compared with instructors in Montserrado County Educational District 1B who profess they hardly do that. Apua (2016) also revealed that pre-service instructors lack technological content knowledge and they were unable to create lessons that effectively blended their subject area, technology, and methods of instruction. It

can be surmised that history instructors in Montserrado County Educational District 1B lack technological content knowledge.

Research Question Four: What is the level of technological pedagogical content knowledge of history instructors in the senior high schools of Montserrado County Educational District 1B?

This research question aimed at discovering the level of History instructors' technological pedagogical content knowledge in secondary schools in Montserrado County Educational District 1B. It was to find out whether teachers agreed or disagreed with certain claims made about their technological pedagogical content knowledge for teaching and learning history. Through nine(9) close-ended items, instructors were to select their most preferred views to specify their thoughts on each item on a scale of 1= Uncertain; 2, = Completely Disagree; 3=Disagree; 4 = Agree and 5 = Totally Agree. The mean score interval was interpreted as low knowledge =1.00- 2.32, moderate knowledge = 2.33- 3.66, and high knowledge = 3.67-5.0. Table 6 presents the technological pedagogical content knowledge

Table 6: History Instructors' Technological Pedagogical Content Knowledge (n=77)

Statement	UC		D/ CD		TA/ A		Means	S. D
	No.	%	No.	%	No.	%		
I am capable of creating notes that effectively integrate content, technology, and instructional strategies.	23	2.9.9	26	33.8	28	34.4	2.66	1.37
I have the ability to choose which technologies to utilize in my classroom, and by doing so, I can improve not only what I teach but also how I teach it and the knowledge that my students acquire.	20	26.0	32	42.0	25	32	2.62	1.32
I am able to employ techniques that integrate subject matter, technology, and methods of instruction.	17	22.1	35	45.5	25	32.5	2.62	1.20
I am able to incorporate technology that improves students' ability to grasp history content.	17	22.1	29	37.7	31	40.2	2.83	1.27
I am able to locate and use materials from the internet that clearly illustrate a particular concept in history.	10	13.0	23	29.8	44	57.2	3.33	1.27

Table 6: Continued

I am able to make use of technology to promote scientific research within the classroom	22	28.6	31	40.3	24	31.2.	2.69	1.32
I have the ability to utilize technology to develop efficient representations of subject matter that differ from the approaches taken in textbooks.	23	30.0	26	34.0	28	36.0	2.68	1.33
I am able to devise activities to assist learners in constructing different depictions of the subject matter using suitable technology (for instance, inspiration, Web inspiration classroom, and blog).	23	30.0	34	44.0	20	26.0	2.48	1.26
I can use technology that is appropriate, such as blogs and web quests, to develop self-driven instructional tasks for my subject understanding	22	28.6	32	41.6	23	39.8	2.53	1.26
Average							**2.72**	**1.29**

Source: Field Survey (2023)

Table 6 again, presents the results of History instructors' responses on their technological pedagogical content knowledge in secondary schools in Montserrado County Educational District 1B. Majority of the instructors disagreed that they are capable of creating notes that effectively integrate content, technology, and instructional strategies (M = 2.66, SD = 1.37). They also disagreed that they have the ability to choose which technologies to utilize in my classroom, and by doing so, they can improve what they teach and also how they teach it and the knowledge that their students acquire (M = 2.62, S.D = 1.32). The instructors again disagreed that they are able to employ techniques that integrate subject matter, technology, and methods of instruction (M = 2.62, S.D = 1.20). Most of them also disagreed that they are able to incorporate technology that improves students' ability to grasp history content (M = 2.83, S.D = 1.27). Majority of the instructors also indicated their disagreement that they are able to locate and use materials from the internet that clearly illustrate a particular concept in history (M = 3.33, SD = 1.27).

In Table 6 again, majority of the instructors disagreed that they are able to make use of technology to promote scientific research within the classroom (M = 2.69, SD = 1.32). Similarly, majority disagreed again that they have the ability to utilize technology to develop efficient representations of subject matter that differ from the approaches taken in textbooks (M = 2.68, S.D = 1.33). furthermore, most of them strongly disagreed that they are able to devise activities to assist learners in constructing different depictions of the subject matter using suitable technology (for instance, inspiration, Web inspiration classroom, and blog) (M = 2.48, S.D = 1.26). Finally, most of them agreed that they can use technology that is appropriate, such as blogs and web

quests, to develop self-driven instructional tasks for their subject understanding (Mn = 2.53, S.D = 1.26).

It was recorded from the responses that average score of 2.72 and SD= 1.29 were recorded indicating that the history instructors have moderate level of technological pedagogical content knowledge in secondary schools in Montserrado County Educational District 1B. This may be as a result of the fact that the instructors have been exposed little to the use of modern sophisticated technologies that need to be incorporated into education in the country. This finding also disconfirms Yalley (2016) who found that Social Studies instructors approved that they were able to articulate and develop the content of "Social Studies" that incorporate technology and makes it understandable to pupils. Here, they can utilise technological tools to widen conversations in the classroom outside the walls of the classroom. The findings of Yellay (2016) also back the assertion that effective technology integration requires teachers to be proficient in three areas: technology, technology-supported instructional design. The finding of this current study support Apua (2016), Guzey and Roehrig (2009) who found that the low state of the pre-service teachers' technological pedagogical content knowledge would obstruct successful instruction in these 21st-century educational settings.

Hypotheses

H_0.1: There is no statistically significant difference in History instructors' technological and pedagogical content knowledge based on gender.

This hypothesis was formulated to determine whether there is any difference in History teachers' technological pedagogical content knowledge based on gender. An independent sample T-test was used to compare the mean

difference between male and female teachers' technological pedagogical content knowledge to achieve this. The assumption of homogeneity of variances was tested and was not violated. Table 7 gives details of the results of the t-test.

The results indicate that History teachers who are males had an average score, (M= 24.95; SD=8.19, n=63) while the female teachers had a mean score was (M= 22.14; SD= 6.19, n= 14); t (75) = 1.20, p= .234). The magnitude of the difference in the means was tiny (eta squared = .002). Due to the p-value of .234, which is greater than the sig value, results show no statistically significant difference in teachers' technological pedagogical content knowledge based on their gender. Therefore, the null hypothesis fails to be rejected. Here, the rate at which a male teacher will be knowledgeable and use teachers' technological pedagogical content is the same for females.

Table 7: History Instructors' Technological and Pedagogical Content Knowledge and Gender

Variable	Group	N	Mean	SD	DF	t-value	p-value
Gender	Male	63	24.95	8.19	75	1.20	.234
	Female	14	22.14	6.49			

Source: Field Survey Data (2023)

The results show that gender does not influence History teachers' ability to use their technological pedagogical content knowledge when teaching History. This finding is not surprising as it reflects the findings of studies that have been curious to learn whether the utilization of technology is influenced by gender (Jang & Tsai, 2012; Lin, Tsai, Chai & Lee, 2013; Gomez-Trigueros, Yanez de Aldecoa, 2021). Karaca's (2015) findings

revealed a substantial difference between male and female pre-service teachers' test results. It was implied that the teachers in pre-service TPACK varied depending on their gender and that female teachers in pre-service had higher TPACK scores than their male counterparts. There is a difference between male and female teachers on matters revolving around history teachers' technological pedagogical content knowledge. Therefore, it is essential to expose teachers of both sexes equally to technology and how it can enhance instruction. As a result of this, both men and women teachers would be sufficiently prepared to meet the requirements for a 21st-century learning environment.

Koh et al. (2010) revealed the importance of the gender factor in the TPACK perceptions of pre-service students. This study is consistent with other studies like that of Markauskaite (2006), who showed that male teachers are more confident in using computers than their female colleagues; Lin et al. (2013), who found higher PK for female teachers but lower TK; and Scherer et al. (2017), who found that for all the T-factors, males report higher competency than females

$H_0$2: There is no statistically significant difference in History instructors' technological and pedagogical content knowledge based on age.

This hypothesis was formulated to investigate if there is a variation in the technological pedagogical content knowledge of History instructors based on their age. In doing this, a one-way between-groups analysis of variance was employed to compare the average difference in technological pedagogical content knowledge between male and female teachers. The assumption of equal variance (homogeneity) was tested and found to be valid.

This analysis (A one-way between-groups analysis of variance) was performed to examine how age impacts the technological pedagogical content knowledge of History instructors. The History teachers were divided into four groups according to age (Group 1: Below 22 Years; Group 2: 22-27 Years; Group 3: 26-31 Years; and Group 4: 32+ Years). There was a statistically significant difference at $p<.05$ in History instructors' technological pedagogical content knowledge for the four age groups [$F(3, 73) = 3.631$, $p=.017$]. Therefore, the null hypothesis can be rejected.

Table 8: History Instructors' TPACK and Age

Variable	Group	N	Mean	SD	Df	f-value	p-value
Age	Below 22 Years	1	42.00	.00	3(73)	3.613	.017
	23-27 years	13	21.62	5.47			
	28- 31 Years	20	22.10	6.16			
	32+ Years	43	25.98	8.58			

Source: Field Survey Data (2023)

Despite achieving statistical significance, there was only a small actual difference in the mean score. The effect size, measured by eta square, was .15. further analysis using the Turkey HSD test revealed that Group 1 (M=42.00, SD=0.00), had significantly different mean scores compared to Group 2(M=21.61, SD=5.47), Group 3(M=22.10, SD=6.16), and Group 4(M=21.61, SD=8.58). In conclusion, all four groups showed significant differences when compared to Group 1.

The results contradict the findings of Guo et al. (2008), who found no significant difference in technology competence among different age groups of pre-service instructors. However, Hofer and Harris (2017) emphasised the importance of tailoring TPACK-based training modules for more experienced

instructors. This aligns with the research conducted by Lin, Tsai, Chai, and Lee (2013) which empirically demonstrated that instructors with more experience tend to have lower confidence in their TPACK. Teaching experience and age are closely intertwined factors that are challenging to separate, as the majority of the experienced instructors are also older. The History teachers have shown in the current study that they are different in their knowledge. Here, it was seen that teachers below 22 years are highly knowledgeable in TPACK as compared to other age groups.

H_0.3: There is no statistically significant difference in History instructors' technological and pedagogical content knowledge based on academic qualification.

This hypothesis was formulated to determine whether there is any difference in history teachers' technological pedagogical content knowledge based on academic qualification. To achieve this, a one-way between-groups analysis of variance ANOVA was used to compare the mean difference between BSC in Education, "AA" Certificate, "B" Certificate, and "C" Certificate History teachers' technological pedagogical content knowledge. The assumption of equal variance (homogeneity) was tested and found to be valid.

The History teachers were divided into four groups according to their academic qualification (Group 1: BSC in Education, "AA" Certificate, "B" Certificate and "C" Certificate; Group 2: "AA" Certificate; Group 3: "B" Certificate and "C" Certificate and Group 4: "C" Certificate). There was no statistically significant difference at $p<.05$ in History teachers' technological

pedagogical content knowledge for the academic qualification [F (3, 73) =1.600, p=.197]. Therefore, the null hypothesis fails to be rejected (Table 9).

Table 9: History Instructors' TPACK and Academic Qualification

Variable	Group	N	Mean	SD	DF	F-value	P-value
Academic Qualification	BSC in Education	19	24.00	8.74	3(73)	1.60	.197
	"AA" Certificate	24	25.20	7.99			
	"B" Certificate	31	25.03	7.28			
	"C" Certificate	3	15.00	5.56			

Source: Field Survey Data (2023)

The effect size, calculated using eta squared, was .15. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (M= 24.00, SD= 8.74) was significantly different from Group 2 (M= 25.20, SD=57.99), group 3 (M= 25. 03, SD=7.28) and Group 4 (M= 15.00, SD=5.56). Out of the four groups, it was seen that only groups one and four differ from the rest, groups two and three which had similar means, although there was no statistically significant difference amongst the group.

Mailizar, Hidayat, and Artika (2021) in Indonesian revealed substantial differences in teacher qualification (master's degrees and bachelor's degrees) in TPACK across the technological constructs. This demonstrates that master's degree instructors possess a greater level of the technological constructs of the TPACK paradigm than instructors with bachelor's degrees. Anthony, Subali, Pradana, Hapsari, and Astuli (2019) also saw that any instructor with extra training produces pupils with better accomplishments.

This is also corroborated by Goldhaber and Brewer (2000) and Zuzovsky (2009), who opined that higher education instructors show a

positive relationship with pupils' educational achievement. However, Anthony et al. (2019) found no substantial indication that master's degrees improved the efficacy of instructors at the senior high school level.

$H_0$4: There is no statistically significant difference in History instructors' technological pedagogical content knowledge based on teaching experience

This hypothesis was formulated to determine whether there is any difference in History instructors' technological pedagogical content knowledge based on teaching experience. To achieve this, between-groups analysis of variance (ANOVA) was conducted to compare the mean difference between teaching experience (1-5 Years, 5-10 Years, 10-15 years, and 15 Years Above Years) and teachers' technological pedagogical content knowledge. The assumption of equal variance (homogeneity) was tested and found to be valid. Table 10 gives details of the results of the two-way ANOVA.

The History teachers were divided into four groups according to their teaching experience (Group 1: 1-5 Years; Group 2: 5-10 Years; Group 3: 10-15 Years; and Group 4: 15 Years Above Years). There was a statistically significant difference at $p<.05$ in history teachers' technological pedagogical content knowledge based on the teaching experience of history teachers [$F(3, 73) = 2.824$, $p=.045$]. Therefore, the null hypothesis can be rejected.

Despite reaching statistical significance, the difference in mean scores between the groups was very small. The effect size, calculated using eta squared, was .10. Post-hoc comparisons using the Tukey HSD test in Table 10 indicated that the mean score for Group 1 (M= 22.04, SD= 6.15) was

significantly different from Group 2 (M= 23.73, SD= 7.23), group 3 (M= 28.83, SD=8.06) even though, there is no considerable difference between Groups 2 and 4.

Table 10: History Teachers' TPACK and Teaching Experience

Variable	Group	N	Mean	SD	Df	F-value	P-value
Teaching Experience	1-5 Years	24	22.04	6.15	3(73)	2.824	0.45
	5-10 Years	18	23.72	7.22			
	10-15 Years	18	28.83	8.06			
	15 years above	17	23.94	9.48			

Source: Field Survey Data (2023)

Nazari, Nafissi, Etaji, and Marandi (2019) found that the study shows that experience instructors' scores were significantly higher in the constructs of TPACK that have to do with (PK and PCK). According to Hervey (2015), when instructors have abundant knowledge of the subject matter and instructional approaches, it is due to the many years that they have spent in the classroom, which thus indicates the proficiency of these teachers in the areas of instructional methods and subject matter but a limitation when it comes to technological knowledge. Hsu, Tsai, Chang, and Liang (2017), inexperienced instructors take advantage of their knowledge of technology in classroom instruction.

Chapter Summary

The study's overall objective was to assess History Instructors' Technological Pedagogical Content Knowledge in the Senior High Schools of Montserrado County Educational District 1B, Liberia. It was further noticed that an average mean score of 3.12 (SD= 1.32%) was obtained for most of the

teachers' responses that they have moderate knowledge of the technological knowledge in secondary schools of Montserrado County Educational District 1B. Most of the instructors agreed with most of the statements presented to them, which resulted in an average mean of 2.80 and a standard deviation of 1.27) indicating that most of the History instructors have a moderate level of technological content knowledge in secondary schools.

From the result, an average score of 2.83 (S.D = 1.34) was observed from the responses, indicating that History instructors have moderate technological pedagogical knowledge in teaching history in secondary schools of Montserrado County Educational District 1B. It was recorded from the responses that an average score of 2.72 and SD= 1.29 were recorded, indicating that the History instructors have a moderate level of technological pedagogical content knowledge.

The results show no statistically significant difference in teachers' technological pedagogical content knowledge based on gender. Therefore, the null hypothesis fails to be rejected. Here, the rate at which a teacher who is male will be knowledgeable and use teachers' technological pedagogical content is the same for females. There was a statistically significant difference at $p<.05$ in History teachers' technological pedagogical content knowledge for the four age groups [$F (3, 73) =3.631$, $p=.017$].

There was no statistically significant difference at $p<.05$ in History teachers' technological pedagogical content knowledge for the four age groups [$F (3, 73) =1.600$, $p=.197$]. There was a statistically significant difference at $p<.05$ in History instructors' technological pedagogical content knowledge for the four age groups [$F (3, 73) =2.824$, $p=.045$].

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

Overview

This is the final chapter of the study, and it focuses on the summary of the research process and major findings, the study's conclusion, and recommendations to assist in policy formulation for development and better teaching experience. It further makes provisions by suggesting other areas for further studies.

Summary of the Work

The development of computer technology in 21st-century learning and instruction necessitates ongoing interaction between instructors and learners and educational technology. This imposes a considerable burden on teachers to have the necessary 21st-century knowledge and skills that will assist them in incorporating digital technology, pedagogy, and content into instructions.

The study's overall objective was to assess History Instructors' Technological Pedagogical Content Knowledge in the Senior High Schools of Montserrado County Educational District 1B, Liberia. The research questions and hypothesis below directed the study.

1. What is the level of technological knowledge of History instructors in the senior high schools of Montserrado County Educational District 1B?
2. What is the level of technological pedagogical knowledge of History instructors in the senior high schools of Montserrado County Educational District 1B?

3. What is the level of technological content knowledge of History instructors in the senior high schools of Montserrado County Educational District 1B?
4. What is the level of technological pedagogical content knowledge of History instructors in the senior high schools of Montserrado County Educational District 1B?

Hypotheses

H0.1: There is no statistically significant difference in history teachers' technological pedagogical content knowledge based on gender.

H02: There is no statistically significant difference in history teachers' technological pedagogical content knowledge based on age.

H0.3: There is no statistically significant difference in history teachers' technological pedagogical content knowledge based on academic qualification.

H04: There is no statistically significant difference in history teachers' technological pedagogical content knowledge based on teaching experience.

The descriptive survey cross-sectional survey design of the quantitative research approach was used in conducting this study. The population of this study consisted of all 85 secondary school History instructors within Montserrado County Educational District 1B, Liberia. A census survey was utilised to get the respondents involved. The main data collection tool was a questionnaire. Several validity and reliability tests were conducted. The duration for the administering of the questionnaires was two weeks. The data

was processed utilizing SPSS version 25. Inferential and descriptive statistical tools were used to analyse the data collected.

Summary of Key Findings

1. The results found that the instructors have moderate level of technological knowledge in secondary schools of Montserrado County Educational District 1B. Instructors were found to be partially equipped with the ability and skill to quickly master technology, capable of finding solutions to difficulties, knowledgeable about various kinds of technology, download and install the necessary software applications, and use computer equipment such as a printer, scanner, digital camera, projector, and interactive chalkboard.
2. History instructors were found to have moderate level of technological pedagogical knowledge in teaching history in secondary schools of Montserrado County Educational District 1B. History instructors were moderately knowledgeable in increasing students' involvement in learning when using technology, enhancing communication and interaction with students by utilizing technology, using various technologies to enhance a lesson, and improving instructional strategies for a given lesson in addition to increasing student involvement in learning.
3. It was found again that most History instructors have moderate level of technological content knowledge in Montserrado County Educational District 1B secondary schools. Instructors were found to be moderately capable of using the World Wide Web to search

in the classroom, skilled in using relevant emerging technologies in History assessment of learners, use technological representations to illustrate particular concepts in History, and knowledgeable about emerging technology.

4. Again, History instructors were found to have moderate level of technological pedagogical content knowledge in teaching history in secondary schools in Montserrado County Educational District 1B. Instructors were found to be partially able to employ techniques that integrate subject matter, technology, and methods of instruction, able to incorporate technology that improves students' ability to grasp history content. Instructors can also locate and use materials from the internet that clearly illustrate a particular concept in history, use technology to promote scientific research within the classroom, and rarely utilise technology to develop efficient representations of subject matter that differ from textbook approaches.
5. The results show no statistically significant difference in instructors' technological pedagogical content knowledge based on gender.
6. There was a statistically significant difference in History instructors' technological pedagogical content knowledge for the four age groups.
7. It was found that there was no statistically significant difference in History instructors' technological pedagogical content knowledge based on their academic qualifications.

8. Lastly, there was a statistically significant difference in History instructors' technological pedagogical content knowledge found based on the teaching experience of History instructors.

Conclusions

The findings of this study help to draw the following conclusions:

1. Again, it can be concluded that students in Montserrado County Educational District 1B are taught with small knowledge of technology in history. Therefore, students' low interest and their low academic performance maybe be as a result of history instructors minimal use of technology. This implies that history instructors have minimal knowledge in the requisite technical skills to utilize various forms of technology.
2. It can be established that students of history Montserrado County Educational District 1B are taught with instructors know little or nothing about the use of the appropriate pedagogical practices needed for the teaching of the subject to make history students intelligent in using technology to solve most problems the world faces today and pass their examinations. This connotes the idea that history instructors have deficiency in using social media in instruction, facilitating students working together, employ new technology to improve.
3. Moreover, it can be established that students' low interest and their low academic performance is depending on instructors' low knowledge in blending the subject of matter of history and modern technology to achieve the aims of teaching history. This implies that instructors are not familiar with how to present contents through the utilization of

various forms of technology, knowledgeable about the technologies for understanding of content. Therefore, students' failure may be partly be ascribed to this problem.

4. Furthermore, it can be surmised that history instructors in secondary schools in Montserrado County Educational District 1B are part of the students' low interest and poor performance because the instructors have limited knowledge in teaching history by blending technology and content through the suitable pedagogical practices that are needed to make students develop an interest in the studying of History. This infers that history instructors in secondary schools in Montserrado County Educational District 1B are less capable of creating notes that effectively integrate content, technology, and instructional strategies, and less able to choose which technologies to utilize in my classroom.
5. It can be said that history instructors in secondary schools in Montserrado County Educational District 1B are moderately capable of creating notes that effectively integrate content, technology, and instructional strategies, and less able to choose which technologies to utilise not based on gender. Both female and male instructors are able use technology to some extent. Therefore, all instructors no matter their gender contribute to students' low interest and poor performance since the teachers have limited knowledge in teaching history by blending technology and content through the suitable pedagogical practices.
6. Moreover, the History instructors' TPACK scores vary significantly across different age groups. Instructors' age appears to influence their

technological and pedagogical knowledge related to content delivery. Sstudents' low interest and poor performance may be attributed to the instructors of different age group having limited knowledge in teaching history by blending technology and content through the suitable pedagogical practices.

7. It can be surmised that History instructors' TPACK scores similar significantly across different academic qualifications. Instructors' age appears to influence their technological and pedagogical knowledge related to content delivery.
8. Lastly, history instructors and professors exhibit varying TPACK levels based on the teaching experience of History instructors. The age-related differences are statistically significant. This indicates that History instructors' TPACK scores varied significantly across the teaching experience of History teachers.

Recommendations

The following recommendations can be made based on the findings and conclusions drawn from this study.

1. It is recommended that History instructor education institutions endeavour to include the TPACK curriculum in their training program documents. Additionally, school principals should provide technology coaches or mentors who can work closely with instructors to help them develop their technological knowledge and skills. These coaches can offer one-on-one training, direction, and sustenance tailored to individual teachers' specific needs and challenges.

2. It is recommended that the instructors should be encouraged to take part in professional development programs designed specifically to improve their technological skills and knowledge. These programs can provide hands-on training, workshops, and resources to assist them in becoming more proficient in using technology.
3. It is suggested that History instructors collaborate with colleagues with strong technological skills in various fields. Instructors can benefit from peer learning by learning from one another and sharing best practices. Instructors can observe and learn from their colleagues' technology-integrated classroom practices.
4. All History instructors with moderate technological skills should be directed to online platforms, websites, and communities with resources and tutorials to support educators. Websites such as Edutopia, Common Sense Education, and Teaching Tolerance offer useful articles, videos, and lesson plans that can assist teachers in improving their technological competence.
5. It is recommended that develop and implement professional development programs that cater to the specific needs and learning styles of different age groups. For instance, provide more foundational technology training for older teachers while offering advanced tech-integration strategies for younger teachers.
6. Since no significant differences were found in this instance, implement universally beneficial training programs, focusing on core technological competencies and content integration strategies that apply to all age groups.

7. Since a statistically significant difference is seen in History instructors' TPACK for the age, it is recommended to establish peer mentoring systems where teachers from different age groups collaborate and share best practices. Younger, tech-savvy teachers can assist older teachers in integrating technology, while experienced teachers can provide pedagogical insights.
8. Given the mixed results indicating both significant and non-significant differences in TPACK among different age groups, a nuanced approach is needed. Promote blended learning models that combine traditional teaching methods with digital tools. This approach can help bridge the gap between different age groups by providing a balanced mix of familiar and new teaching strategies, making technology integration smoother for all teachers.

Areas for Further Studies

It needs to be said that the study has done its part.

The study involved only secondary schools in Montserrado County Educational District 1B. Therefore, future studies may involve public schools and find out the views they hold concerning the History Instructors' Technological Pedagogical Content Knowledge in teaching History. Again, the study used a questionnaire as the data collection instrument. It is proposed that future studies use interview and observation guides, which allow researchers to ask the participant to answer orally and observe the phenomenon under study unfold on the issue compared to using a predetermined questionnaire to provide answers.

This study can also be replicated in other regions to discover how best History Instructors teach with or without TPACK in teaching History. This study was centred in the Montserrado County Educational District 1B of Liberia. Another study needs to look at the influence of teaching History with TPACK on learners' academic achievement.

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APPENDICES

APPENDIX A

ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 0558093143/0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: IRB/C3/Vol.1/0301
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0011497

10TH AUGUST, 2023

JORGOOI 1497

Mr. Kiazah Molly Sherman

Department of Arts Education

University of Cape Coast

Dear Mr. Sherman

ETHICAL CLEARANCE - ID (UCCIRB/CES/2023/78)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research Assessment of History Instructors' Technological Pedagogical Content Knowledge in the Senior High Schools of Montserrado County Educational District 1B, Liberia. This approval is valid from 10th August 2023 to 9th August 2024. You may apply for an extension of ethical approval if the study lasts for more than 12 months.

Please note that any modification to the project must first receive renewal clearance from the UCCIRB before its implementation. You are required to submit a periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Kofi F. Amuquandoh

Kofi F. Amuquandoh

Ag. Administrator

APPENDIX B

RESEARCH INSTRUMENT

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATIONAL STUDIES

DEPARTMENT OF ARTS EDUCATION

QUESTIONNAIRES FOR RESPONDENTS

This study aims to assess history instructors' technological pedagogical content knowledge.

All information shared during your participation will be held at the utmost discretion, and no respondent who participates in this study will be identified. The researcher will keep all data, as well as any information that could be used to recognize the respondents will not be released or shared with different researchers or organizations.

Signed: _____

Respondent

Instructions

Please respond to the questions on this survey. Check the box [√] that best describes your opinion using the scale right next to every comment. The researcher would appreciate it if you could check the box next to the appropriate response from the list of options.

SECTION A: DEMOGRAPHIC DATA

1. Gender Male: [ ] Female: [ ]
2. Age below 22yrs [ ]

   22-27yrs [ ]

   28-31yrs [ ]

32+ yrs. [ ]

3. Present Qualification: BSC in Education [ ]

"AA" Degree [ ]

"B" Certificate [ ]

"C" Certificate [ ]

4. Teaching Experience: 1- 5 years [ ]

5- 10 years [ ]

10- 15 years [ ]

15 years above [ ]

Reveal your level of agreement or disagreement with the following statements in Sections B, C, D, and E, using the scale by checking using [√]: **Uncertain = UC, Completely Disagree = CD, Disagree=D, Agree= A, Totally Agree= TA**

SECTION B: Technological Knowledge of History Instructors

1.	**Technological Knowledge**	UC	CD	D	A	TA
2.	I have the requisite technical skills to utilize various forms of technology.					
3.	I am equipped with the ability and skill to quickly master technology.					
4.	I am capable of finding solutions to the difficulties I experience when utilizing technology.					
5.	I am knowledgeable about various kinds of technology.					
6.	I can download and install the necessary software applications that I need.					

7.	I can use basic computer equipment such as a printer, scanner, digital camera, projector, and interactive chalkboard					
8.	I am knowledgeable and skilled in the usage of several kinds of social networks, including: (WhatsApp, Facebook, blogs, and Wiki)					
9.	I am skilled in creating and editing videos.					
10.	I can develop my webpage.					
11.	I am able to download a file or picture from the internet and save it on my laptop.					
12.	I am skilled in the usage of common software applications such as Word documents, PowerPoint, and Excel during lesson presentations.					
13.	Using a word processing program, I can create a document that contains both text and images.					
14.	I am able to attach files to messages that I send through email.					
15.	I am capable of developing websites of my own.					

SECTION C: Technological Content Knowledge of History Instructors

# 2	**Technological Content Knowledge**	UC	CD	D	A	TA
1.	I am familiar with how contents in history can be presented through the utilization of various forms of technology.					
2.	I am knowledgeable about the technologies I can use to better my understanding of particular contents in history.					
3.	I am capable of using the World Wide Web to search for contents of history.					
4.	I am skilled in using relevant emerging technologies to present the contents of history (such as multimedia and simulation)					
5.	I can use technological representations to illustrate particular concepts in history, such as multimedia, and visual representations.					
6.	I am knowledgeable about emerging technology in history education.					

SECTION D: TECHNOLOGICAL PEDAGOGICAL KNOWLEDGE OF HISTORY INSTRUCTORS

# 3	**Technological Pedagogical Knowledge**	UC	CD	D	A	TA
1.	I am capable of using technology that improves my instructional strategies for a given lesson.					
2.	I can employ new technology to improve and increase student involvement in learning.					
3.	I can make use of technologies that are suitable for the lessons I teach.					
4.	I am capable of integrating technology into a variety of teaching tasks.					
5.	I am skilled in using modern technology to evaluate learners in a variety of ways.					
6.	I can make my students more familiar with real-world situations by utilizing various forms of technology					
7.	I am capable of helping my students track and plan their learning using technology.					
8.	I can guide my students through the process of building a variety of knowledge representations through the use of technology.					
9.	I am capable of using social media in my instruction.					
10.	I can facilitate my students working together utilizing technology.					
11.	I can employ new technology to improve and increase student involvement in learning.					

12.	I can enhance my communication and interaction with students by utilizing technology.					
13.	I can use technology to improve my approaches to teaching.					
14.	I can use various technologies to enhance how a lesson is presented to students.					

SECTION E: Technological Pedagogical Content Knowledge of History Instructors

# 4	**Technological Pedagogical Content Knowledge**	UC	CD	D	A	TA
1.	I am capable of creating notes that effectively integrate content, technology, and instructional strategies.					
2.	I have the ability to choose which technologies to utilize in my classroom, and by doing so, I can improve not only what I teach but also how I teach it and the knowledge that my students acquire.					
3.	I am able to employ techniques that integrate subject matter, technology, and methods of instruction.					
4.	I am able to incorporate technology that improves students' ability to grasp history content.					
5.	I am able to locate and use materials from the internet that clearly illustrate a particular concept in history.					
6.	I am able to make use of technology to promote scientific research within the					

	classroom					
7.	I have the ability to utilise technology to develop efficient representations of subject matter that differ from the approaches taken in textbooks.					
8.	I can devise activities to assist learners in constructing different depictions of the subject matter using suitable technology (for instance, inspiration, Web inspiration classroom, and blog).					
9.	I can use appropriate technology, such as blogs and web quests, to develop self-driven instructional tasks for my subject understanding.					