Hawassa University

Institute of Technology Faculty of Informatics

Department of Information Technology

The Role of Continuous Professional Development (CPD) for ICT Training and Perception of Secondary Schools Teachers for ICT Adoption for Teaching and Learning in Case of Gedeo Zone, Wenago Wereda

Thesis submitted to the Department of Information Technology in partial fulfillment of MSc. In Information Technology

Advisor: Dr. Tesfaye Bayu

Submitted by: Merhatsidk Nekatibeb

Hawassa, Ethiopia (2024)

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DEDICATIONS

This study of ICT use in Wonago schools is dedicated to:“Teachers of Wonago schools: for their unwavering commitment to education despite the challenges they face. Their dedication to teaching and their willingness to adopt and improve are the driving forces behind the push for better ICT integration and support. Support staff and technical: who play a crucial role.To my parents, Dagimawit, Elias, Etsigent, Nekatibeb, and my child Nahome, for their unwavering support, love, and encouragement. Your belief in me kept me going through every challenge. This is as much yours as it is mine.”

DECLARATION

I declared that this thesis is my original work and that all sources of the materials used for this have been properly acknowledged and not mentioned in any of the universities.

Name: Merhatsidk Nekatibeb

Signature_____

Date_____

This thesis has been submitted for examination with my approval as thesis advisor.

Advisor: Dr.Tesfaye Bayu

Signature_____

Date_____

DEPARTMENT OF GRADUATE COMMITTEE

HAWASSA UNIVERSITY

EXAMINERS APPROVAL SHEET

THE ROLE OF CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD) FOR ICT TRAINING AND PERCEPTION OF SECONDARY SCHOOLS TEACHERS FOR ICT ADOPTION FOR TEACHING AND LEARNING

APPROVED BY BOARD OF EXAMINERS

Name	signature	date
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Advisor_____	_____	_____
External examiner_____	_____	_____
Internal examiner_____	_____	_____

ACKNOLEDGEMENTS

I am greatly appreciative to my supervisor, Doctor Tesfaye Bayu (assistant professor), for his educational guidance during the entire process of thesis writing. The successful end of this thesis would not have been possible without their awesome support. Special thanks to all my lecturers and staff in the department of postgraduate studies who supported me through the course. I honestly thank my beloved family for inspiring and encouraging me during my studies. I am especially grateful and thankful to my parents and sister for tirelessly kindly me on. To Dagimawit Wondemu, TaddleZenebe, and Etsigent Nekatibeb, you are awesome people. Thank you for believing in me. Finally, I acknowledge the support of my classmates, Hamedla Mohammed, Chala Taye, MizanGedamu, and Simenh Anemut, and all participants who made it possible for me to successfully end this thesis. Special thanks to the staff at Wonago, Hase, and Sokicha secondary school teachers. My god blesses all of them plentifully.

ABSTRACT

This study was explored the significance of Continuous Professional Development (CPD) in enhancing ICT training among secondary school teachers in the Gedeo Zone, Wenago Wereda. The study utilized a mixed-methods approach, combining quantitative and qualitative data through a sequential explanatory design. Research was conducted in three secondary schools in the Wonago, Sokicha, and Hase Haro areas of South Ethiopia, Gedeo Zone, focusing on teachers involved in CPD programs. The total population for this study comprised 165 individuals, with a sample size of 90 participants determined using the Yamane formula. Respondents were selected through simple random sampling, and data collection involved structured surveys and semi-structured interviews to capture teachers' attitudes towards CPD and ICT integration. Quantitative data were analyzed using the statistical package for social science (SPSS) version 20.0, utilizing descriptive statistical techniques such as frequencies and percentages. Data were presented in tables and diagrams, while qualitative data were conveyed in narrative format. The analysis integrated descriptive statistics and thematic analysis to provide a comprehensive understanding of the challenges teachers faced in ICT adoption.

This study was explored the significance of Continuous Professional Development (CPD) in enhancing ICT training among secondary school teachers in the Gedeo Zone, Wenago Wereda, emphasizing the crucial role of Continuous Professional Development (CPD) for teachers. Despite a significant recognition of CPD's importance—69.1% of teachers acknowledged its necessity for improving ICT skills and 81.5% recognized its role in enhancing teaching techniques—an alarming 98.8% reported having received no formal ICT training. This gap highlighted systemic barriers, including a lack of resources, insufficient motivational support, and time constraints, which hindered effective CPD implementation.

Theoretical frameworks such as Andragogy, Transformative Learning Theory, and Communities of Practice underscored the need for tailored CPD programs that addressed the specific challenges faced by educators. While teachers expressed enthusiasm for ICT, they often resisted adoption due to inadequate training and support. Empirical evidence revealed a disconnect between training and practical ICT integration, with only 2.5% of teachers utilizing learning web portals, indicating minimal engagement with digital resources.

The findings emphasized the necessity for CPD initiatives to focus on developing technical skills and fostering a collaborative culture among teachers. Despite recognizing CPD's potential to improve perceptions of ICT, significant challenges remained due to resource limitations and disparities in access across regions. Moreover, the absence of robust monitoring and evaluation mechanisms hindered the assessment of CPD initiatives' impact.

Qualitative feedback from school principals highlighted the transformative potential of well-structured CPD programs in boosting teachers' confidence and knowledge in ICT. Establishing Professional Learning Communities could facilitate the sharing of strategies and experiences, promoting continuous improvement in teaching practices. To address these challenges, the study recommends developing tailored CPD programs focused on relevant ICT skills, enhancing resource allocation, and providing formal ICT training. Establishing Professional Learning Communities can foster collaboration among educators, while implementing robust monitoring and evaluation mechanisms will ensure CPD effectiveness. By prioritizing these initiatives, Wenago Schools can significantly improve ICT integration and educational outcomes for students.

Keywords: *ICT, CPD, assessment, and perceptions*

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List of acronyms and abbreviations

ICT……..Information and Communication Technology

CPD ……Continuous Professional Developments

ESDP……..….Educational Sector Development Program

ETP……..Ethiopian Training and Policy

OER……...…. Open Education Resources

TPACK……Technological Pedagogical Content Knowledge

MOE……..…Ministry of Education

LMS……..Learning Management System

SPSS…….Statistical Package Social Science

H E……Higher Education

TPB…….Theory of Planned Behavior

TAM……technology acceptance model

CBAM……concerned based adoption model

UNESCO……..…United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

The integration of information and communication technologies (ICT) into educational practices has been recognized as a critical factor in enhancing teaching and learning outcomes. According to (Ertmer and Ottenbreit-Leftwich 2010), the successful incorporation of ICT in education not only improves the learning environment but also empowers teachers to deliver more effective instruction. In secondary education, where student engagement and the relevance of learning materials are paramount, ICT offers numerous opportunities for innovation. In the Gedeo Zone, Wenago Wereda; the education system faces both challenges and opportunities related to ICT integration. While there is a growing awareness of the benefits of these technologies, the actual implementation and effectiveness can differ significantly among educators. Understanding secondary school teachers' perceptions of ICT is essential, as their attitudes directly influence their willingness and ability to adopt these tools in their classrooms.

Additionally, Continuous Professional Development (CPD) activities play a crucial role in equipping teachers with the skills and confidence needed to utilize ICT effectively. According tothe Ministry of the Education (2009, 2017), "CPD is anything that makes me a good teacher, targeting the development of teachers' performance in school situations for students." However, the effectiveness of CPD programs in preparing teachers for ICT integration within the context of Gedeo Zone, Wonago, Wereda, remains underexplored.

This study aims to assess secondary school teachers' perceptions of the use of ICT in teaching and learning, while also evaluating the role of CPD activities on their preparedness to adopt these technologies. By addressing these critical areas, the research seeks to provide insights that can inform educational policies and practices, ultimately enhancing the quality of education in the region.

In the era of digital technology, information and communication technology (ICT) has emerged as a crucial factor in reshaping education. The integration of ICT in teaching and learning processes offers new opportunities for enhancing educational outcomes and fostering innovative teaching methods. The Ministry of Education (MoE n.d.), is underscoring the

advancement and incorporation of ICT in education as a way to modernize instruction and learning.ICT is regarded as a vital element in enhancing educational standards and accessibility. Under (ESDP VI 2018) it highlights the significance of integrating ICT into the educational framework to enhance teaching and learning. In the Gedeo Zone, Wenago Wereda, a region categorized by its unique educational challenges and opportunities, the adoption of ICT in secondary schools is both a promising and complex endeavor.

Information and communication technology is a significant and effective means for expanding educational opportunities. Thus, various methods and stages of education will see improvements in teaching and learning processes (UNESCO 2006). However, successful integration of ICT in the teaching and learning process is dependent on the planning of teachers and teachers' continuing professional development (CPD). Continuing professional development (CPD) can bridge the hole in their digital skills and enhance their confidence in classroom practices. The incorporation of ICT into the teaching and learning process relies on the training of teachers and their continuing professional development (CPD). There has been a considerable emphasis placed on CPD for teachers and trainers to support them using technology(Henderson and Yeow 2010).

The project 'ICT in a Global world' emphasizes educators' views on utilizing digital tools for learning, creation, and problem-solving in their daily tasks. Particularly in sub-Saharan Africa, governments underscore the values of professional development for teachers, focusing on the use of ICT to improve teaching and learning (Hennessy et al. 2010). Professional development involves activities such as regular in-service training, workshops, local and national conferences, and college courses (Desimone 2009).

Discussions among technology proponents and critics about the role of ICT in classroom instruction have been increasing, while debates over the benefits of ICT in education contribute to its limited use, The lack of ICT resources in schools is another significant factor. Other influences include the realities and culture of the average classroom, as well as teachers' knowledge, skills, opinions, and expertise (Studley 2001), with a notable hole in professional development for teachers. Ultimately, the success of learning is more influenced by the pedagogical approach to effectively utilizing ICT than by the mere availability of technology.

Pre-service teacher training programs alone are insufficient for equipping educators to effectively use information and communication technology (ICT) in the classroom. Many

researchers contend the existing professional development programs fall short in preparing teachers for the demands of the 21st century (Borko 2014).Ongoing professional development (CPD) enables teachers to learn how to utilize computers to improve their knowledge and skills and to create high-quality educational materials through technology. Educational systems worldwide are under growing pressure to incorporate new ICT tools into their curricula to equip students with the knowledge and skills required for the 21st century (Hue and Jalil 2013). Integrating ICT can enhance educational quality by offering targeted support in challenging subject areas (Gulbahar and Ismail 2008). When used under optimal condition, with suitable resources, effective training methods, and adequate support-,ICT can positively impact teaching and learning (Hue and Jalil 2013). Educators will also acquire skills in using computers to enhance their knowledge and skills and to create high-quality educational materials through technology.

To effectively integrate technology with professionalism, educators need to possess the necessary knowledge, skills, and expertise. However, integrating ICT is not a straightforward process (Bhasin 2012).The findings (Bingimlas 2019) indicate that while teachers strongly desire to incorporate ICT into education, They face several obstacles. The primary challenges include a lack of confidence, insufficient skills, and inadequate resources. These issues-confidence, competence, and accessibility are crucial factors affecting the successful integration of technology in schools. Teachers in contemporary Ethiopia are expected to be reflective and adaptive to meet the demands for high-quality-education from both the government and the community. This underscores the importance of continuous professional development (CPD), which aims to enhance the quality of the teaching-learning process and overall educational standards. The use of ICT for teaching purposes has normally been limited in Ethiopian schools and teacher training institutions (Zelalem, Melesse, and Seifu 2022).

1.2 Statement of the problem

The integration of information and communication technologies (ICT) into teaching and learning has become increasingly vital in modern education, particularly in secondary schools. Despite the potential benefits of ICT in enhancing educational practices, the actual implementation and effectiveness of these technologies often vary significantly among educators. In the Gedeo Zone, Wenago Wereda, there is limited understanding of secondary school teacher's perceptions regarding the use of ICT in their teaching methodologies.

Additionally, the significance of Continuous Professional Development (CPD) activities in providing teachers with the essential skills and knowledge to effectively use these technologies is still inadequately examined.

This study aims to address the gap in knowledge regarding how secondary school teachers perceive ICT integration in their classrooms, as well as how CPD initiatives contribute to their readiness and ability to adopt these tools.

1.3 Objectives of the study

1.1.1 General objectives

To investigate the role of Continuous Professional Development (CPD) in enhancing ICT training and shaping the perceptions of secondary school teachers towards the adoption of ICT for teaching and learning in the Gedeo Zone, specifically in Wenago Wereda.

1.1.2 Specific objective

- To assess the perception of secondary school teachers in the use of ICT in teaching and learning
- To assess the roles of implementation of continuous professional development (CPD) in the implementation of ICT in education.
- To assess the challenges of implementation of continuous professional development (CPD) in the implementation of ICT in education.

1.4 Basic research questions

- What is the perception of teachers in the use of ICT in teaching and learning?
- What are the roles of the implementation of continuous professional development (CPD) in the implementation of ICT in teaching and learning?
- What are challenges of the implementation of continuous professional development (CPD) in the implementation of ICT in teaching and learning?

1.5 Significance of research

Understanding the perception of secondary school teachers and school principals regarding ICT and the role of continuous professional development (CPD) activities is crucial for improving educational practices. In Gedeo Zone, where technological adoption is still evolving, this study aims to provide valuable insights that could inform policy decisions and enhance the effectiveness of educational interferences. (Hue and Jalil 2013), the success of

technology integration in education largely centers on educators' crucial role in enhancing ICT integration and overcoming resistance to its use, Thus, it can be concluded that the frequency and effectiveness of ICT use in the classroom are significantly influenced by educators' attitudes (UNESCO 2006). Furthermore, teachers' experience with ICT can greatly influence the effective integration of ICT into teaching, and learning, and these experiences help identify teachers' need for continuous professional development (CPD) to ensure proper ICT integration in the classroom. Additionally, this study provides valuable insights for those involved in teachers' training and educational technology curriculum development regarding the practical use of ICT in context. Consequently, it enables relevant parties to enhance their programs.

1.6 Organization of the study

This thesis is organized into five chapters as follows: Chapter one provides an introduction and background to the study, including the statements of the problem, study objectives, research questions, the significance of the research, and the scope and limitations of the study. Chapter two focuses on a review of related literature, covering the importance of teachers' CPD in ICT education, ICT skill training, and development, access and opportunities for ICT skill development, national policies and strategies on CPD, previous studies on ICT use in education in Africa and globally, and specific studies on ICT use in Ethiopian education. This chapter also addresses issues in ICT use and the demands for CPD, along with the conceptual framework. Chapter three details the research methodology, including data collection methods, study design, study settings, and sampling techniques, and explains the rationale behind the chosen research methods. Chapter four presents and analyzes the statistical data using SPSS, interprets the result, and attempts to address the research questions. Finally, chapter five summarizes the research findings, discusses how the research questions were answered, and highlights the contributions of the research to the existing body of knowledge.

1.7 Scope and limitations of the study

This study concentrates on secondary school teachers and principals in Gedeo Zone, Wonago Wereda, exploring their views on ICT and the influence of CPD activities on ICT integration. Although the result will offer useful insights, the study is confined to this particular region and may not fully represent the wider context of ICT adoption in other regions.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

This literature review aims to explore the theoretical frameworks and empirical studies concerning teachers' perceptions of Information and Communication Technology (ICT) in teaching and learning. By synthesizing existing research, the review identifies key factors that influence teachers' attitudes and behaviors regarding ICT use, especially in the context of Continuous Professional Development (CPD). Furthermore, it discusses the challenges and barriers teachers face in integrating ICT effectively, particularly in the educational setting of Gedeo zone, Wenago Wereda. Understanding these dynamics will provide valuable insights for policymakers, educational leaders, and researchers focused on creating a more supportive environment for ICT utilization in classrooms.

2.1 Continuous Professional Development (CPD) in Ethiopia

Continuous Professional Development (CPD) in Ethiopia is an essential initiative that aims to enhance the skills, knowledge, and competencies of professionals across various sectors, particularly in education, healthcare, and information and communication technology (ICT). Recognizing the importance of CPD, the Ethiopian government has prioritized the development of a skilled workforce capable of meeting local and global demands, which is crucial for personal career advancement, improving organizational performance, and aligning with national development goals. CPD fosters economic growth by equipping the workforce with up-to-date skills required to adapt to new technologies and methodologies.

In the education sector, CPD is vital for improving educational quality through targeted programs for teachers. Research by Alemayehu (2022) indicates that effective CPD should be context-specific, incorporating collaborative and practical approaches. Workshops and training sessions aimed at enhancing pedagogical skills, classroom management, and subject knowledge are integral to these initiatives. Similarly, the healthcare sector requires continuous learning for professionals to keep pace with rapid advancements in medical practices. (Abdi 2024), stresses that CPD not only enhances healthcare delivery but also improves patient outcomes. Regulatory bodies in Ethiopia mandate CPD as part of the licensing processes for healthcare workers, ensuring compliance with current standards.

The rapidly evolving ICT sector underscores the necessity of CPD. According to Kefyalew (2020), training in software development, data science, and cyber security is critical to bridging existing skills gaps. The rise of e-learning and online education platforms has introduced innovative solutions to address diverse training needs, especially for ICT professionals in remote areas Tadesse et al.(2022). However, despite the recognized importance of CPD, various barriers hinder its effectiveness, including resource limitations, high workloads, and a lack of awareness about available opportunities. Ayalew and Habtamu (2018), highlight that these factors significantly reduce participation in CPD activities.

To enhance CPD in Ethiopia, several strategies are recommended. Strong governmental support and policies are necessary to create a favorable environment for CPD initiatives, including funding mechanisms and incentives for organizations that prioritize continuous learning (Beyecha 2018). Additionally, fostering partnerships between educational institutions, the government, and the private sector can lead to the development of relevant CPD programs that meet market needs (Melaku and Tiruneh 2020). Establishing structured mentorship initiatives can further facilitate knowledge transfer and support the professional development of junior staff (Muluken 2022).

Looking to the future, ongoing research into the effectiveness of CPD programs is essential; longitudinal studies can provide insights into their long-term benefits for career advancement and workforce productivity. Embracing new technologies in CPD delivery, such as interactive online courses and mobile applications, can enhance accessibility and engagement among professionals. Promoting a culture of lifelong learning across all sectors will encourage continuous pursuit of CPD opportunities, contributing to overall national development.

CPD is a vital component in strengthening Ethiopia's workforce amid evolving economic, technological, and social dynamics. By addressing existing barriers, enhancing the relevance of programs, and fostering a culture of continuous learning, Ethiopia can significantly improve the effectiveness and impact of CPD across various sectors, resulting in both individual growth and the achievement of broader economic development goals.

Continuous Professional Development (CPD) plays a crucial role in enhancing the skills and knowledge of educators, especially in the face of rapidly evolving educational technologies and methodologies. CPD refers to ongoing learning activities that professionals engage in to maintain and enhance their competence and effectiveness. In the context of Ethiopian

education, effective CPD can significantly improve teachers' ability to integrate ICT into their teaching practices, thereby improving educational outcomes. Teachers' participation in CPD programs that focus on ICT adoption can enhance their technological literacy and foster more innovative teaching practices.

2.2 Theoretical Frameworks Supporting CPD

Several theoretical frameworks inform the design and evaluation of CPD programs. These include Adult Learning Theory (Andragogy 2001), Transformative Learning Theory, and Communities of Practice. (Knowles' (1980) 1986) *Adult Learning Theory* emphasizes that adult learners, such as teachers, are motivated to learn when they find the material relevant to their personal and professional lives. In Ethiopia, CPD programs that are directly related to teachers' needs and local contexts are more likely to be effective. Additionally, *Transformative Learning Theory*, which highlights the role of critical reflection in adult learning, suggests that teachers can undergo transformative changes in their teaching practices and attitudes toward ICT through reflective practices. Furthermore, (Wenger 1999) *Communities of Practice* posits that learning occurs through participation in social communities. CPD programs that promote collaboration among teachers create supportive networks that facilitate the sharing of best practices and enhance learning.

2.3 Empirical Research on CPD in Ethiopia

In Ethiopia, Continuous Professional Development (CPD) in the Information and Communication Technology (ICT) sector is crucial for addressing skills shortages and supporting technological advancement. Research, including studies by Alemayehu et al. (2019), highlights significant disparities in ICT skills, identifying a mismatch between the training provided through education and the job market requirements. (WoldeMichael 2018) conducted a needs assessment that revealed many ICT professionals require additional training in emerging technologies such as cloud computing and cyber security, while (Fekade 2021) emphasized the importance of tailored CPD programs that address specific industry needs, noting that generic training often proves ineffective.

The effectiveness of CPD initiatives is further explored in a study by Kefyalew (2020) , which found that hands-on workshops significantly enhance participants' skills and confidence compared to traditional lecture-based approaches. However, there are notable barriers to CPD participation. According to Ayalew and Habtamu (2018) high workloads,

limited access to training resources, and a lack of awareness about CPD opportunities hinder many professionals from engaging in development activities.

The role of technology in facilitating CPD is significant, as research by Tadesse et al. (2022) indicates that online platforms and mobile learning can effectively bridge the training gap, especially for professionals in remote or underserved regions. Additionally, Getachew (2024) discusses the benefits of forming professional communities, stating that collaboration among ICT workers fosters knowledge sharing and enhances professional development. For improving CPD in Ethiopia's ICT sector include strong government support, as argued by Beyecha (2018), who calls for funding and policy reforms to promote continuous training among ICT professionals. (Melaku and Tiruneh 2020) emphasize that higher education institutions must align their curricula with industry requirements to prepare students for current technological challenges. Moreover, (Muluken 2022) identifies mentorship as a critical component of effective CPD, advocating for structured programs that facilitate knowledge transfer from experienced professionals to newcomers.

Overall, CPD initiatives in Ethiopia's ICT sector are essential for bridging skills gaps and supporting digital transformation, but targeted training, enhanced access through technology and community engagement are key to their success. Future research should focus on the long-term impacts of CPD initiatives and strategies for integrating CPD systematically into professional practice within the ICT sector.

Several studies have assessed the status and impact of CPD in Ethiopian education. For instance, (Birehanu (2019) noted that many Ethiopian teachers express a need for more relevant and targeted training, especially regarding technology integration. Despite efforts, many teachers feel that current CPD programs lack focus on ICT-related training. (Tesfaye (2020) evaluated CPD programs and found that while some programs improved teaching practices, the lack of follow-up and reinforcement reduced their effectiveness. Hall and Hord (2014) similarly highlighted that continuous support is critical for successful technology integration. Furthermore, (Abebaw et al. (2021) identified several barriers to CPD participation, including inadequate resources, limited access to training, and insufficient institutional support. These barriers underscore the need for systemic changes to make CPD programs more effective.

2.4 National Policy on CPD for Teachers in Ethiopia

Ethiopia has implemented national policies aimed at improving teacher professional development. The 2009 Education and Training Policy 2016 highlight the significance of CPD for enhancing the quality of education, encouraging collaboration between educational institutions, government bodies, and NGOs. Additionally, the Framework 2023 outlines the objectives and strategies for teacher development across the country, emphasizing the importance of contextually relevant CPD programs aligned with teachers' needs. The National ICT Policy for Education 2016 further emphasizes equipping teachers with ICT skills, making it essential for CPD programs to address technology integration in teaching and learning. For education to fulfill its role in enhancing national capabilities and guiding critical decisions for societal well-being, it must meet minimum quality standards. Among other factors, it is strongly argued that global objectives for learning and teaching, in terms of accessibility, must be accompanied by quality education. This, in turn, requires that teachers are well-equipped to perform their roles effectively. This necessity is reflected in the 8 Education and Training Policy (Republic 1994) and the Education Sector Development Programs outlined in Ethiopia. Teachers in contemporary Ethiopia are expected to be insightful and oriented towards change in order to meet the demands of both administration and community for high-quality education. They are anticipated to adapt to the evolving needs of students and society at large. This situation underscores the significance of continuous professional development (CPD) for teachers, which is aimed at enhancing the quality of teaching methods and overall educational standards. Educators are expected to employ interactive teaching methods to support each student in reaching their full potential. Research on effective education reveals a strong correlation between teacher professional development and educational quality, particularly concerning teachers' beliefs and practices, student learning outcomes, and the implementation of educational reforms (UNESCO 2006). Continuous professional development (CPD) for teachers is believed to have been conceptualized in the mid-1970s (Gray 2005).

2.5 Challenges in Implementing CPD Policies

Despite the existence of a national framework, several challenges hinder the effective implementation of CPD programs in Ethiopia. One of the major issues is resource limitations. Many teachers report that CPD activities often lack essential resources, such as access to computers and reliable internet connections, which are crucial for ICT-related training.

Another challenge is the inconsistent implementation of CPD programs across different regions of Ethiopia. The decentralized nature of the education system leads to disparities in CPD access, with some areas having robust programs while others struggle to provide basic training opportunities. Additionally, the lack of a systematic approach to monitoring and evaluating CPD programs' effectiveness remains a significant challenge. Alemayehu (2022) 2024) suggested that better monitoring mechanisms could enhance the impact of CPD initiatives on teachers' practices and student outcomes. Its foundation lies in constructivist philosophy, which posits that individuals' understandings and perceptions of the world are not static but are continuously evolving. Therefore, it is widely accepted that teachers must engage in ongoing preparation and implementation of their professional development to keep pace with a rapidly changing world. In this context, (Ibrahim and Bekele 2021) emphasized that teacher development is a crucial factor in driving significant improvements in addressing equity, quality, relevance, and efficiency. Variations in a nation's educational system and global demands necessitate staff development initiatives. In a significant effort to tackle issues related to relevance, access, equity, and the quality of educational delivery, the transitional government of Ethiopia (TGE 1998) introduced the Education and Training Policy in 1994. The ETP, supported by provisions in the Ethiopian Constitution, aimed to decentralize educational authority to the 11 states and called for new educational paradigms focused on relevant, dynamic, and student-centered teaching and learning. The Educational and Training Policy (ETP) laid the groundwork for all subsequent strategies, guidelines, and programs. The Education Sector Development Programs I, II, and III, developed in 1997, 2002, 2005, and 2009, respectively, followed this foundation. Aligned with the objective of creating 'trained and skilled human resources at all levels who will be pivotal in advancing democracy and economic growth in the country (MoE 2002), these 9 programs have concentrated on expanding the system, increasing access for marginalized youth and girls, and mitigating erosion. As rapid quantitative growth has occurred, there has been a growing focus on addressing quality issues. Strategies to tackle the perceived decline in educational quality include improving curricula, providing textbooks, enhancing public involvement, and increasing funding for education. Moreover, while all policy documents highlight the crucial role of teachers in facilitating learning, the emphasis on enhancing teacher quality is most pronounced in the 2005 Education Sector Development Program (MoE n.d.).

2.6 Theoretical Frameworks for ICT Adoption

A. Theory of Planned Behavior (TPB)

Developed by (Ajzen 2020), the Theory of Planned Behavior (TPB) posits that individual behavior is primarily driven by intentions, which are influenced by three core components: attitudes toward the behavior, subjective norms, and perceived behavioral control. This theory suggests that if individuals have a positive attitude toward a behavior, perceive social pressure to engage in that behavior, and feel they have the control to perform it, they are more likely to intend to engage in that behavior.

Relevance to ICT**:** In the context of teachers using ICT, TPB provides a valuable framework for examining how teachers' attitudes toward technology, their perceptions of social pressure from colleagues or administration to use technology, and their sense of control over the use of ICT affect their intentions to integrate it into their teaching practices. For instance, if teachers believe that using ICT will enhance their teaching effectiveness and feel supported by their peers, they are more likely to adopt these technologies in their classrooms.

Empirical Findings**:** Numerous studies have utilized TPB to assess educators' technology adoption across various contexts. For example, a study by (Teo 2009) found that teachers' attitudes and perceived behavioral control were significant predictors of their intention to use technology in teaching. Similarly, a study by (Alharbi 2022) highlighted that supportive environments, characterized by access to resources and professional development opportunities, significantly enhance positive attitudes and perceived control among teachers. These findings underscore the importance of creating an enabling environment for ICT adoption.

B. Technology Acceptance Model (TAM)

Proposed by (Davis 1989) the Technology Acceptance Model (TAM) suggests that perceived ease of use and perceived usefulness are critical determinants of technology acceptance. According to this model, if users believe that a technology is easy to use and will enhance their performance; they are more likely to accept and utilize it.

Relevance to ICT**:** TAM is particularly pertinent for understanding why teachers may or may not use ICT in their classrooms. It emphasizes the perceived benefits of educational technologies and their user-friendliness, which are crucial for encouraging teachers to integrate ICT into their teaching practices.

Empirical Findings**:** A wealth of research has applied TAM to explore teachers' technology adoption. For instance, a study by (Teo, Zhou, and Noyes 2016) found strong correlations between perceived usefulness and ease of use with actual technology use in classrooms. Additionally, a study by (Alshammari et al.(2020) 2024) indicated that teachers who perceived ICT as beneficial for enhancing student engagement were more likely to integrate technology into their lessons. These findings highlight the necessity for educational institutions to provide user-friendly technologies and demonstrate their effectiveness to encourage adoption.

C. Concern-Based Adoption Model (CBAM)

Developed by (Hall and Hord (2014) the Concern-Based Adoption Model (CBAM) emphasizes the stages of concern and levels of use associated with new innovations. This model categorizes concerns into several levels, ranging from awareness to personal and management concerns, reflecting teachers' evolving feelings about the implementation of new technologies.

Relevance to ICT**:** CBAM helps identify the specific concerns teachers face regarding ICT integration and their current levels of technology use. Understanding these concerns can provide insights into how to address barriers to effective implementation.

Empirical Findings: Research employing CBAM has explored signals of concern among teachers regarding ICT. For example, a study by Hall and Hord (2014) revealed that many teachers experience anxiety about using new technologies, particularly concerning their adequacy in training and support. Additionally, a study by Ertmer et al. 2010 found that teachers' concerns about their competence in using ICT significantly influenced their willingness to integrate it into their teaching. These findings suggest that addressing teachers' concerns through targeted professional development is essential for successful ICT implementation.

2.7 Teachers' Perceptions of ICT

Teachers' perceptions of ICT play a critical role in determining whether and how they incorporate technology into their teaching practices. A study by Kedir 2023 in Ethiopian schools found that while teachers were enthusiastic about the potential benefits of ICT, such as improved student engagement and enhanced access to resources, there was significant resistance to adoption. This resistance stemmed primarily from a lack of adequate training

and support. This dichotomy between enthusiasm and apprehension is common in many educational settings, where positive perceptions coexist with concerns about the effectiveness of ICT integration.

2.7.1 Positive Perceptions of ICT

Many teachers perceive ICT as a valuable resource that can enhance teaching and learning. They recognize its ability to make lessons more engaging, support diverse learning styles, and facilitate access to a wealth of information and resources. Teachers often report that ICT tools, such as interactive whiteboards, educational software, and online resources, can foster student collaboration and participation. For instance, digital platforms allow for interactive learning experiences, enabling students to work together on projects, participate in discussions, and receive immediate feedback Ertmer and Ottenbreit-Leftwich (2010). In summary, teachers' perceptions of ICT are shaped by a multitude of factors, including their experiences, training opportunities, access to technology, cultural contexts, and pedagogical beliefs. Positive perceptions can lead to effective integration of ICT into teaching, benefiting student engagement and learning outcomes. Conversely, negative perceptions can hinder the adoption of technology and limit its potential. Therefore, addressing the barriers teachers face and providing meaningful professional support are essential for fostering a positive attitude towards ICT in education. By cultivating an environment where teachers feel confident and equipped to use technology, educational institutions can enhance the teaching and learning experience for both educators and students.

2.8 The Role of CPD in Shaping Teachers' Perceptions of ICT

The role of CPD in shaping teachers' perceptions of ICT is central to fostering a positive attitude toward technology integration. Research by Gunter et al. (2018) emphasized that structured CPD programs improve teachers' technical skills and shape their attitudes toward ICT. Effective CPD initiatives not only equip teachers with the necessary technical competencies but also help them understand the pedagogical value of using ICT in the classroom. As a result, teachers are more likely to adopt ICT and integrate it into their teaching practices when they feel confident in their skills and perceive technology as beneficial for student learning.

2.9 Challenges in ICT Implementation

Despite the benefits of CPD, several challenges remain in integrating ICT into Ethiopian classrooms. Studies by Ayele and Teshome 2022 identified barriers such as insufficient training, a lack of resources, and inadequate institutional support. These challenges impede teachers' ability to effectively use ICT in their classrooms. Furthermore, even when CPD programs address these issues, they themselves face obstacles, including limited funding and varying levels of commitment from educational authorities. Overcoming these challenges requires systemic changes, such as improved access to resources and stronger institutional support for CPD initiatives.

2.10 Conceptual Framework Development

Based on the reviewed theories and empirical findings, a conceptual framework can be developed to explore teachers' perceptions of ICT in Ethiopia. The framework includes the following components:

- **Dependent Variable:** Teachers' perceptions of ICT use in teaching and learning.
- **Independent Variables:** Teachers' attitudes (TPB), perceived usefulness and ease of use (TAM), and levels of concern (CBAM).
- **Moderating Variables:** The effectiveness of CPD programs and external support (e.g., policy initiatives).

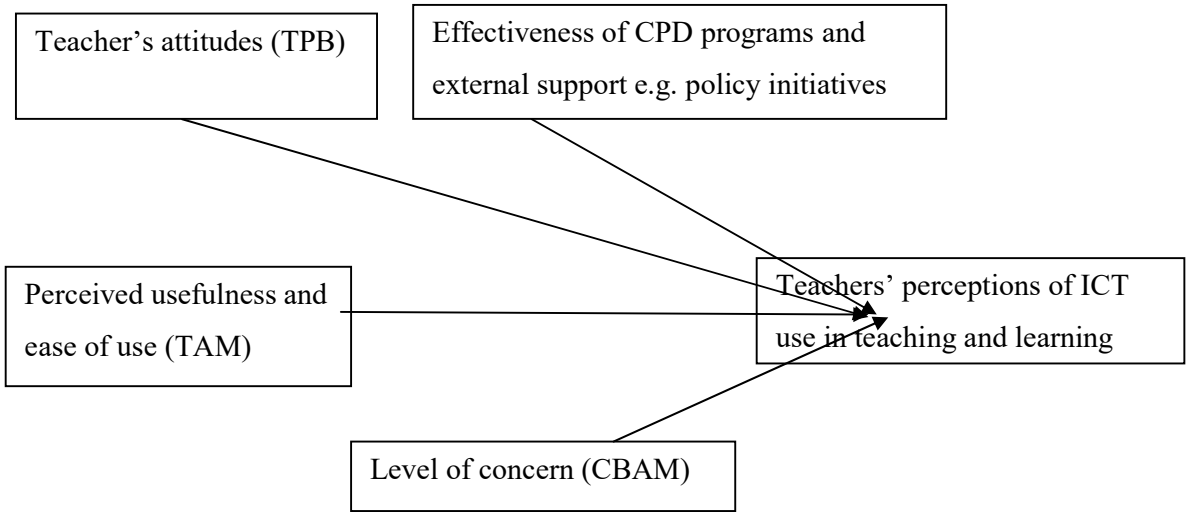

Figure 1 Conceptual Framework Development

This framework will guide the research process, focusing on key data points such as teachers' attitudes toward ICT, their perceptions of its effectiveness, and the barriers they face in ICT implementation. Additionally, it will examine how CPD and external support moderate the relationship between teachers' attitudes and their use of ICT.

This literature review highlights the complex interplay between CPD, teachers' perceptions of ICT, and the challenges faced in integrating technology into classrooms. It draws on a variety of theoretical perspectives, including TPB, TAM, and CBAM, to provide a comprehensive understanding of the factors influencing ICT adoption. By synthesizing empirical research and theoretical frameworks, this review lays the foundation for further exploration into how CPD can support ICT integration in Ethiopian schools, special in Gedeo Zone, Wenago Wereda ultimately improving educational outcomes.

CHAPTER THREE
3. RESEARCH METHODOLOGY

3.1. Introduction

This chapter outlines the research methodology used in this study, which examines the role of Continuous Professional Development (CPD) in ICT training and secondary school teachers' perceptions of ICT adoption for teaching and learning in Gedeo Zone, Wenago Wereda. It includes details on the research design, philosophical approach, data collection methods, sampling techniques, instruments used, data analysis procedures, and ethical considerations. The purpose of this section is to provide a clear and comprehensive account of the methods employed, fulfilling the requirements for a master's thesis (Creswell 2021).

3.2 Explanation of the Study Area

The study was conducted in the Southern nation nationalities and people (SNNP) region, specifically in the Gedeo Zone, Wenago Woreda. This Woreda is one of six in the Gedeo Zone and is bordered by Oromia to the north, Yirgachife to the south, Bule to the east, and Abay to the west. The research focused on three secondary schools in Wenago Woreda.

3.3 Research Design

The research design for this study followed a mixed-methods approach. While a mixed-methods design combined both qualitative and quantitative data, it was essential to carefully integrate the two paradigms (Creswell and Creswell 2017). The key distinction between these paradigms lay in their view of knowledge: the quantitative paradigm was typically associated with discovering objective, pre-existing knowledge (often seen as external to participants), whereas the qualitative paradigm was more concerned with constructing knowledge based on participants' perspectives and experiences (Guba and Lincoln 1994).

To successfully integrate these two paradigms, the study used a sequential explanatory design, where the quantitative data collection and analysis came first, followed by the qualitative data collection and analysis. The quantitative phase aimed to provide broad, statistical insights into teachers' perceptions and CPD participation, while the qualitative phase sought to explore these findings in more depth, adding context and understanding through interviews (Ivankova, Creswell, and Stick 2006).

3.3.1 Rationale for Using Mixed Methods

Although some researchers argued that a mixed-methods approach could not provide a truly comprehensive understanding due to the different underlying paradigms of qualitative and quantitative research, this study intended to bridge the gap by treating the two methods as complementary. The quantitative phase provided a broad understanding of trends and patterns, while the qualitative phase allowed for a deeper exploration of the reasons behind these trends (Onwuegbuzie, Johnson, and Collins 2011). By integrating both methods, this study aimed to capture a more nuanced view of teachers' experiences and perceptions, ensuring a richer and more comprehensive understanding of the research problem (Teddlie and Tashakkori 2012).

3.4 Research Philosophy and Paradigm Integration

The quantitative research paradigm in this study was based on the positivist approach, which assumed that reality was objective and could be measured through surveys (Creswell 2021). On the other hand, the qualitative research paradigm was grounded in constructivism, which emphasized that reality was subjective and constructed through the participants' lived experiences (Lincoln, Lynham, and Guba 2011).

To integrate these two paradigms, this study adopted a pragmatic approach. The pragmatic philosophy emphasized the use of both qualitative and quantitative methods based on the research questions and what worked best to answer them (Biesta 2017). In this case, the quantitative data provided a statistical foundation, while the qualitative data provided context and helped to interpret the numbers more meaningfully.

3.5 Research Methodology

This study used a descriptive research design to assess the perceptions of secondary school teachers and principals regarding ICT integration and CPD activities. A descriptive design was particularly suited for this study, as it allowed for the collection of detailed information without manipulating variables. It focused on understanding the current state of ICT adoption and CPD activities in the schools (Best & Kahn, 2006; Fraenkel & Wallen 2018).

3.6 Case Study Approach

A case study approach was also used in this research, focusing on three secondary schools in

Wenago Woreda. The case study design allowed for an in-depth examination of the specific context and provided valuable insights into the unique challenges and opportunities within these schools, particularly regarding ICT and CPD (Yin 2019).

3.7 Population and Sample

- **Target Population**: Secondary school teachers in Wenago who were involved in CPD programs.
- **Sampling Technique**: Stratified random sampling was used to ensure various demographic characteristics (such as geographical location, years of experience, and subject taught) were represented.
- **Sample Size**: Based on the Yamane formula, the sample size was determined as 90 participants, consisting of 81 teachers and 9 principals. The calculation used was:

Sample size: using 90 Yamane formulas

The researcher was used to determine the sample size by using Yamane formula, which is

$n=N/1+N\ (e)^2$

n=sample size

N=total population=165

e=level of precision (7%) = 0.07

So, the sample size would be 165/ (1+165(0.07) ^) =90.

Accordingly on the Yamane formula 90 teachers and principals were my sample size with 9 school principals and 81 teachers were selected for this study.

3.7 Data Collection Methods

to provide a comprehensive understanding of the research problem, both quantitative and qualitative data collection methods were employed.

- **Quantitative Data Collection**: A structured survey questionnaire was distributed to 81 teachers across the three secondary schools. The questionnaire included Likert-

scale items to assess teachers' attitudes toward CPD programs and ICT integration, and demographic questions to capture relevant characteristics (S. Fowler 2016).

- **Qualitative Data Collection**: Semi-structured interviews and focus group discussions were conducted with 9 school principals and selected teachers. The qualitative phase provided deeper insights into the barriers and challenges that teachers faced in ICT adoption, as well as their perceptions of CPD initiatives (Kvale, 2007; Krueger & Casey 2020).

3.7.1 Questionnaire

The questionnaire used in the quantitative phase of this study was designed to gather both demographic information (age, gender, years of experience) and Likert-scale data regarding teachers' participation in CPD programs, their perceptions of ICT integration, and any barriers they faced. The responses were analyzed using statistical software (SPSS) to identify trends and correlations (Pallant 2022).

3.7.2 Interviews

Semi-structured interviews were conducted with the 9 selected school principals. These interviews focused on understanding their perceptions of ICT integration in teaching, the role of CPD programs, and their suggestions for improving ICT usage in the classroom. The interviews were transcribed and analyzed thematically to identify common themes (Clarke and Braun 2013)

3.8 Analysis Methods Used in the Study

The study employed **a** mixed-methods approach with distinct methods for analyzing quantitative and qualitative data**,** integrating these analyses to comprehensively address the research problem.

1. **Quantitative Data Analysis**

- **Techniques Used**:
    - **Descriptive Statistics**: percentages and frequencies were used to summarize teachers' perceptions of CPD participation and ICT integration.
    - **Software Used**: SPSS software was employed to process and analyze survey responses.

- **Purpose**: To identify patterns, trends, and relationships between teachers' participation in CPD and their levels of ICT adoption.

2. **Qualitative Data Analysis**

- **Technique Used**:
  - **Thematic Analysis**: This method involved systematically coding interview CPD effectiveness and data to identify recurring themes related to ICT adoption challenges
  - **Purpose**: To provide contextual and in-depth insights that complemented the quantitative findings.

Framework: (Clarke and Braun 2013) six-step approach to thematic analysis (familiarization, coding, theme identification, reviewing, defining themes, and reporting).

3. **Integration of Quantitative and Qualitative Methods**

- **Sequential Explanatory Design**: The study first collected and analyzed quantitative data to establish general trends. These findings informed the qualitative phase, which aimed to explore the underlying reasons and contextual factors behind the quantitative results.
- **Pragmatic Philosophy**: Guided the integration of methods, focusing on practical solutions and understanding rather than rigid adherence to specific paradigms.

3.9 Summary of the Analysis method

- **Quantitative Phase**: Provided broad, statistical insights (e.g., frequencies of ICT use, average CPD participation levels).
- **Qualitative Phase**: Added depth and context through thematic exploration of barriers and perceptions.
- **Combined Approach**: Ensured a comprehensive understanding of CPD's role and teachers' attitudes toward ICT adoption by triangulating data sources and methods.

This combination of descriptive statistics and thematic analysis enabled the study to balance measurable trends with rich, contextual narratives, addressing both "what" and "why" questions effectively.

3.10 Ethical Considerations

Ethical standards were strictly followed throughout the research process. Informed consent was obtained from all participants, ensuring they were fully aware of the purpose of the study and their right to withdraw at any time. Confidentiality was maintained by anon missing participants' responses, and ethical approval was obtained from relevant institutions (Sieber, 2013; Israel & Hay 2017).

3.11 Expected Outcomes

The study aimed to generate insights into how CPD programs impacted ICT integration in secondary schools and identify the barriers that hindered effective use of technology in the classroom. The findings provided valuable recommendations for improving CPD initiatives and ICT adoption in Ethiopian secondary schools

3.12 Questionnaire for the research

Below is the table summarizing the research variables, operational definitions, questions, and sources for the data collection: I was develop the questionnaire from practical-guide-to-implement-surveys-on-ict-use-in-primary-and-secondary-schools

Research variables	Operational definition	Questions	Source (journal article)
Percentage of Schools by Preparatory Activities for ICT Use	The proportion of schools engaging in preparatory activities (e.g., workshops, training) to integrate ICT into teaching and learning.	Does your school offer preparatory activities for ICT use? What types of activities are offered? How often are these activities conducted?	Cetic.br (2017). *Pesquisa sobre o uso das Tecnologias de Informação e Comunicação nas Escolas*. Cetic.br.
Percentage of Teachers/Principals by Continued	The percentage of teachers and principals	Have you participated in ICT training? How	Cetic.br (2017). *Pesquisa sobre a Capacitação de*

Professional Development Training for ICT Use	participating in ongoing ICT-related professional development programs.	frequently do you attend professional development activities related to ICT? Has the training helped improve your ICT teaching practices?	*Professores em Tecnologias Digitais*. Cetic.br.

CHAPTER FOUR

4. Data presentation and discussion

This chapter presented the results and discussed the findings from the study on ICT use and professional development in educational settings. The purpose of this chapter was to analyze the data collected and provide insights into various aspects related to the use of ICT in schools, focusing on demographic characteristics, ICT activities, and the role of continuous professional development (CPD). Data for this study was gathered through surveys and interviews with teachers and school principals. This chapter provided a comprehensive analysis of the demographic profiles of the participants, explored their ICT usage activities, and assessed their perceptions of ICT training and CPD programs.

It started by presenting the demographic characteristics of both teachers and school principals, which was crucial for contextualizing the study results. Key areas of discussion for this chapter included activities for ICT use by teachers, examining how teachers incorporated ICT into their teaching practices; perceptions of ICT skill development training, analyzing teachers' views on the effectiveness of ICT training; the role of CPD in ICT implementation, discussing how CPD programs contributed to ICT integration in teaching; challenges of CPD in ICT implementation, identifying obstacles faced in implementing effective CPD programs; perceptions of ICT pedagogical practices, exploring teachers' opinions on ICTs' impact on pedagogical practices; barriers to ICT use, addressing the challenges that impeded ICT use in schools; and interview findings, summarizing key insights from interviews with school principals regarding CPD and ICT integration.

4.1 Demographic of the respondents

Demographics characteristics include age, sex, teaching experiences and academic qualifications presented in below diagram.

4.1.1 **Demographics characteristics of the teachers**

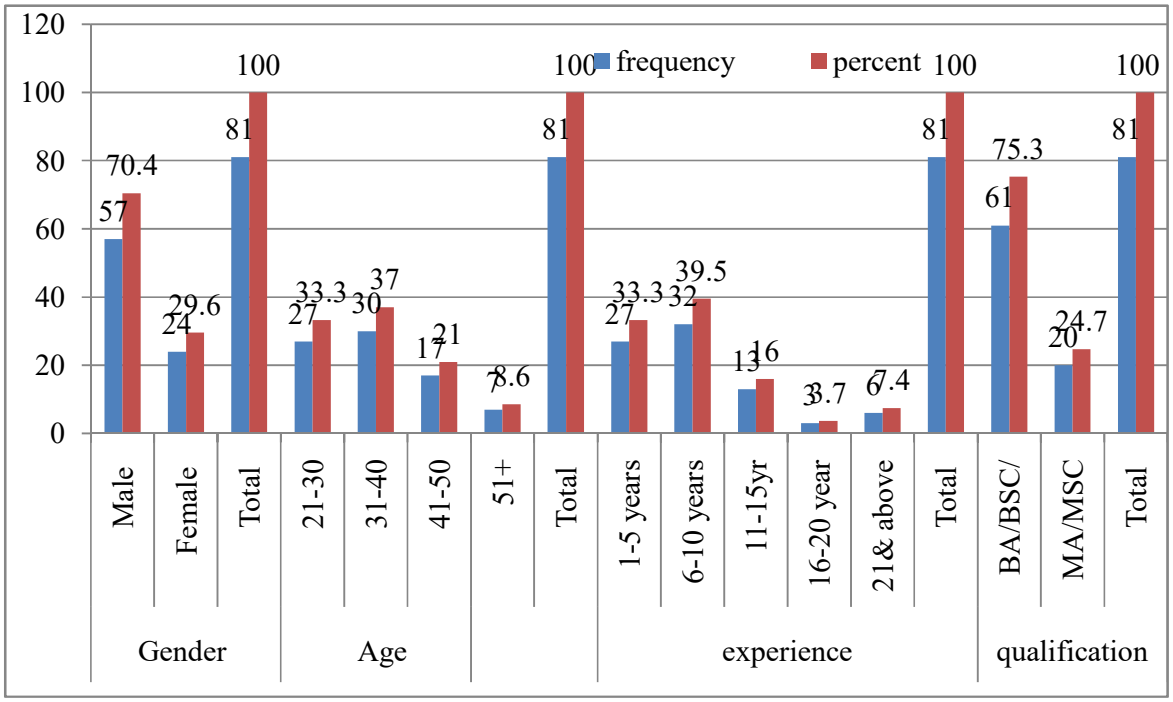

Figure 2 Demographic characteristic of teachers

Figure 3 shows teachers' demographic findings under the gender category, male as frequency 57 and percentage 70.4% and female as frequency 24 and percentage 29.6%, gender total frequency is 81 and total percentage is 100%. This indicates that the majority of the respondents were male. Under the age category between 21–30 years the frequency is 27 and percent 33.3%, between 31–40 years the frequency is 30 and percentage 37%, between 41–50 years the frequency is 17 and percentage 21% , above 51 years the frequency is 7 and the percentage is 8.6% and age total frequency is 81 and total percentage is 100%.This indicates that the majority of the respondents' age was between31-40.The experience based on the years between 1–5 years the frequency is 27 and the percentage is 33.3%, between 6–10 years the frequency is 32 and the percentage is 39.5%, between 11–20 years the frequency is 13 and the percentage is 16%, between 16–20 years the frequency 3 and the percentage is 3.7% above 21 years the frequency is 6 and the percentage is 7.4% and experience total frequency is 81 and total percentage is 100%. This indicates that the majority of the respondents' experiences were between, 6-10. Finding under academic qualifications shows BA or BSC degree the frequency is 61 and the percentage is 75.5% and MA or MSC the frequency is 20 and the percentage is 24.7% and academic qualification total frequency is 81 and total percentage is 100%.This shows that the majority of the teacher respondents' had BA/BSC degrees.

4.1.2 Demographic characteristics school principals

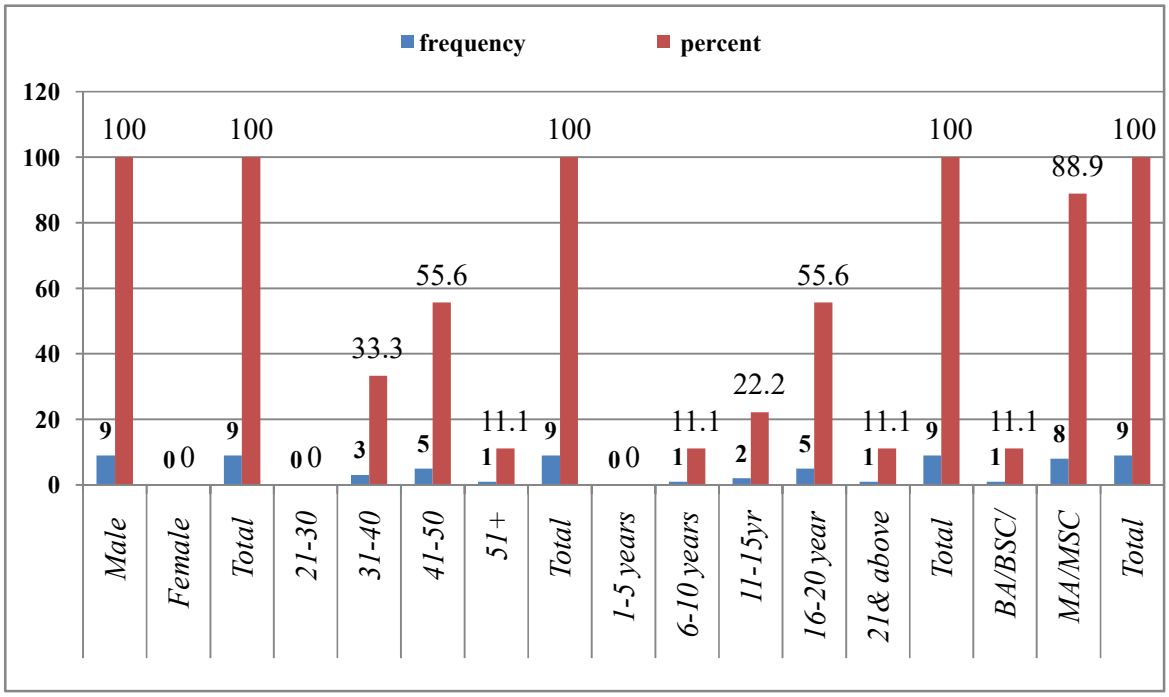

Figure 3 demographic characteristics of school principals

Figure shows a principal's demographic finding under gender category male as frequency is 9 and percentage is 100%, female as frequency is 0 and percentage is 0. This indicates that all school principals were male. Under the age category between 21–30 years the frequency is 0 and the percentage is 0, between 31–40 years the frequency is 3 and the percentage is 33.3%, between 41–50 years the frequency is 5 and the percentage is 55.6%, above 51 the frequency is 1 and the percentage is 11.1%-This indicates that the majority of the school principals' ages were, between 41-50 years old. Experience based of the years between 1-5years the frequency is 0 and the percentage is 0, between 6–10 years the frequency is 1 and percentages are 0, between 11–15 years the frequency is 2 and the percentage is 22.2%, between 16 and 20 years the frequency is 5 and the percentage is 55.6%, above years the frequency is 1 and the percentage is 11.1%. This shows that most of the school principals' experiences are between 16-20 years. Findings under academic qualification show BA/BSC the frequency is 8 and the percentage is 88.9% and MA/MSC the frequency is 1 and the percentage is 11.1%.This shows that the majority of principals' qualified in first degrees while only one principal qualified in master degrees.

4.2 Activities for ICT use by teachers

This indicator measures the activities done by teachers' using digital devices and the internet to prepare classes &other teaching-learning activities.

Table 1 Activities for ICT use by teachers

1. Access to learning web portal.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	2.5	2.5	100.0
	no	79	97.5	97.5	97.5
	Total	81	100.0	100.0	
2. Share learning content with teachers.					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	yes	12	14.8	14.8	100.0
	no	69	85.2	85.2	85.2
	Total	81	100.0	100.0	
3. Search for content to use in the classroom.					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	6	7.4	7.4	100.0
	no	75	92.6	92.6	92.6
	Total	81	100.0	100.0	
4. Search instructive TV programs					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	yes	13	16.0	16.0	100.0
	no	68	84.0	84.0	84.0

	Total	81	100.0	100.0	
5. Access info and services found on Educational portals.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	3.7	3.7	100.0
	No	78	96.3	96.3	96.3
	Total	81	100.0	100.0	

The above table presents data regarding the access and use of various ICT resources by teachers. Specifically focusing on secondary school teachers, Here's a detailed discussion of the findings.

Teachers' access to learning web portals, findings Yes, (2.5%) or no, (97.5%), this result shows that only a tiny fraction of teachers (2.5%) engage with learning web portals, whereas the overwhelming majority (97.5%) do not. This indicated that the majority of teachers in Wonago schools did not access the learning web portal through digital devices or the internet. The main reason for this was that most schools in Wonago lacked digital devices and limited internet connections used to access learning web portals.

Share learning content with teachers. Findings: Yes, (14.8%) or No, (85.2%). Very small percentage of teachers (14.8%) exchange learning content with their peers, whereas the vast majority of teachers (85.2%) do not: This shows that most teachers in schools did not share learning content with teachers due to limited access to digital platforms and a lack of collaboration culture.

Search for content to use in the classroom. Finding: Yes, 7.4 % or No, 92.6%. A very small number of teachers (7.4%) actively search for content to use in their classrooms, while the vast majorities (92.6%) do not. Most teachers in Wonago schools lack the skills to search content for classroom use and predominately still rely on traditional searching methods.

Search instructive TV programs. Finding: Yes, 16% or No, 84%. A substantial proportion of teachers (16%) look for educational TV programs, while the majorities (84%) do not. This indicates that the majority of teachers in Wonago have a scarcity of search educational TV programs.

Access info and services found on educational portals. Findings: Yes, 3.7% or No, 96.3%, a very small percentage of teachers (3.7%) access information and services found on educational portals, while 96.3% do not. This indicates that the majority of teachers in Wonago schools lack knowledge and skill gaps to access info and services found on educational portals.

4.3 Perception of teachers ICT skill development activity training for teaching and learning practices

Table 2 teachers' participation in ICT training in teaching and learning practices

1. ICT training delivered by the school.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	3.7	3.7	100.0
	No	78	96.3	96.3	96.3
	Total	81	100.0	100.0	
2. ICT training delivered by a governmental organization.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	2.5	2.5	100.0
	No	79	97.5	97.5	97.5
	Total	81	100.0	100.0	
3. ICT self-financed training.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	4.9	4.9	100.0
	No	77	95.1	95.1	95.1
	Total	81	100.0	100.0	
4. ICT skill development participation of teachers, sharing experience in conference					

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	2.5	2.5	100.0
	No	79	97.5	97.5	97.5
	Total	81	100.0	100.0	

5. I did not take any training on ICT use in teaching and Educational practices.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	80	98.8	98.8	100.0
	No	1	1.2	1.2	2.5
	Total	81	100.0	100.0	

The data I provided offers a snapshot into the extent of teachers' participation in ICT training and their experience related to ICT skill development for teaching and learning practices. Here's a deeper discussion based on the presented data.

ICT Training delivered by the school. Yes, 3(3.7%) or 78, (96.3%) have participated. This indicates that majority of schools there is no ICT training for teachers.

With just 3.7% of teachers attending such program, it shows that most schools in Wonago are lacking in providing ICT training for teachers. Consequently, most of teachers in these schools lack of necessary ICT skills and knowledge to effectively apply ICT in teaching and learning

ICT Training Delivered by a governmental organization. Yes, 2(2.5%) or No, 79(97.5%) have participated. The low percentage of teachers receiving ICT training from governmental organizations (2.5%) the main reason for this most of governmental organizations lack the budget to provide ICT training for teachers.

ICT Self-Financed Training, Yes, 4(4.9%) or No, 77(95.1). a small number of teachers (4.9%) have invested in ICT training out of their own pockets. The majority of teachers in

Wonago schools lacked awareness about the importance of such training or financial constraints preventing teachers from pursing these opportunities independently.

ICT Skill Development through Sharing Experience in conferences. Yes, 2(2.5%) or no, 79(97.5%). Only a very small proportion of teachers (2.5%) have participated in ICT skill development by sharing experiences in conferences. This shows that the majority of schools in Wonago lack resources or administrative support to facilitate teachers' attending at conference.

No ICT Training. Yes, 80(98.8%) or no, 1(1.2%). The overwhelming majority of teachers (98.8%) report that they have not received any form of ICT training related to teaching and educational practices. This indicates that the majority of schools lack ICT resources and absence technical support.

4.4 Role of continuous professional development (CPD) in ICT implementation

Table 3 Role of CPD in ICT

1. Skill enhancement					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Disagree	11	13.6	13.6	13.6
	Neutral	14	17.3	17.3	30.9
	Agree	56	69.1	69.1	100.0
	Total	81	100.0	100.0	
2. Pedagogical improvement					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Disagree	9	11.1	11.1	11.1
	Neutral	6	7.4	7.4	18.5
	Agree	66	81.5	81.5	100.0
	Total	81	100.0	100.0	

3. Assessment and evaluations					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Disagree	13	16.0	16.0	16.0
	Neutral	27	33.3	33.3	49.4
	Agree	41	50.6	50.6	100.0
	Total	81	100.0	100.0	
Valid	4. Enhancing Problem-Solving Abilities				
		Frequency	Percent	Valid Percent	Cumulative Percent
	Disagree	12	14.8	14.8	14.8
	Neutral	14	17.3	17.3	32.1
	Agree	55	67.9	67.9	100.0
	Total	81	100.0	100.0	

On skill enhancement shows that important majority of teachers (69.1%) agree that continuous professional development (CPD) in ICT is essential for improving their ICT skills. Only 13.6% disagree, with the remaining 17.3% being neutral. This strong agreement emphasizes the belief that CPD plays a vital role in preparing teachers with the necessary technological skills to successfully integrate ICT into their teaching practices.

The high percentage of agreement indicates that teachers identify the need for continuing training to stay present with evolving technologies and to enhance their ability in using ICT tools.

In terms of pedagogical improvement, 81.5 % of teachers agree that CPD in ICT significantly contribute to improving their teaching techniques. Only 11.1% disagree, and 7.4% are neutral. This vast agreement highlights the perception that CPD not only improve technical skills but also improves teaching strategies. Teachers who participate in CPD programs likely

gain perceptions into advanced teaching methods and methods that leverage ICT, thereby improving the overall quality of their pedagogical practice

When it comes to assessment and evaluations, the data shows that 50.6% of teaches agree that CPD in ICT aids in educating their assessment and evaluation practices. However, 16% disagree, and important 33.3% are neutral. This recommends a more mixed view concerning the influence of ICT-focused CPD on assessment and evaluation skills. While some teachers understand strong benefits in terms of integrating technology into assessment processes, others it could touch that the link between CPD and improved assessment practices is less direct or not obvious.

For enhancing problem-solving abilities, 67.9% agree that CPD in ICT helps grow their problem-solving skills. This is matched by 14.8% who disagree and 17.3% who are neutral. The important majority who agree shows that CPD is observed as a valuable instrument for adopting serious thinking and problem-solving skills through the application of technology. This proposes that ICT training is not only about obtaining technical skills but also increasing the ability to address challenges and find solutions in instructional situations.

Insights from School Principals

Interviews with school principals further highlight CPD's transformative role. One principal described CPD as a cornerstone in enabling teachers to integrate ICT effectively into teaching. "CPD provides a structured platform for educators to learn about digital tools, pedagogical strategies, and practical challenges in technology integration. It bridges the gap between traditional methods and modern, technology-driven approaches, fostering both technical competence and confidence among teachers" Abebaw et al. (2021) .

CPD also influences principals' decision-making processes regarding technology adoption. Another principal noted: "CPD programs provide valuable feedback on the practicality and usability of ICT tools. This helps prioritize investments in tools that enhance student collaboration or address specific gaps in teacher training. Essentially, CPD ensures technology decisions are aligned with the actual needs and readiness of teachers" (Razak and Yusop 2015).

Examples of CPD's impact on mentoring and supporting staff further illustrate its value. One principal shared how CPD informed the introduction of a learning management system

(LMS). Through training sessions and peer-mentoring groups, teachers were empowered to use the LMS for managing communication, assignments, and student progress. Similarly, CPD enabled the effective integration of interactive whiteboards into everyday teaching, resulting in more engaging lessons and improved outcomes (Thakral 2015).

The findings collectively emphasize that CPD is vital for ICT integration in education. It enhances teachers' technical and pedagogical skills, informs strategic decision-making, and facilitates mentoring practices that support the effective use of technology. To maximize these benefits, CPD programs should be tailored to address specific challenges, foster collaboration, and ensure equitable access to resources and training opportunities. By doing so, schools can create an enabling environment for ICT-driven educational transformation.

4.5 Challenges of continuous professional development (CPD) in ICT implementation

Table 4challenges of CPD in ICT

1. Lack of ICT resources					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid					
	Neutral	1	1.2	1.2	1.2
	Agree	80	98.8	98.8	100.0
	Total	81	100.0	100.0	
2. Absence of ICT training					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1.2	1.2	1.2
	Neutral	1	1.2	1.2	1.2
	Agree	79	97.5	97.5	100.0
	Total	81	100.0	100.0	
3. Lack of time					

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagreed	9	11.1	11.1	11.1
	Neutral	8	9.9	9.9	21.0
	Agree	64	79.0	79.0	100.0
	Total	81	100.0	100.0	

4. Lack of teachers and school leader motivations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	2.5	2.5	2.5
	Agree	79	97.5	97.5	100.0
	Total	81	100.0	100.0	

5. Insufficient support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagreed	1	1.2	1.2	1.2
	Neutral	1	1.2	1.2	2.5
	Agree	79	97.5	97.5	100.0
	Total	81	100.0	100.0	

The data on challenges related to continuous professional development (CPD) in ICT offers perceptions into the major obstacles that teachers face in successfully implementing and profiting from ICT training. Here is a detailed discussion of each recognized challenge.

The overwhelming agreement (98.8%) between respondent that a deficiency of ICT resources is a challenge shows a serious barrier to effective CPD in ICT. this challenge advises that despite the acknowledgement of the importance of CPD, the nonexistence of adequate technological resources such as computers, software, and internet access-hinders the ability to

conduct and participate in meaning ICT training. The shortage of resources can limit chances for hands on skill and practical application, which are essential for effective learning and integration of ICT tools into teaching practices.

The data specifies that (97.5%) of defendants agree that the lack of ICT training is a significant challenge this proposes that numerous teachers look for problems due to the lack of accessible CPD programs specifically focused on ICT. the close common agreement on this problems highpoints the serious need for organized and available ICT training programs. Without these training chances, teachers may fight to stay updated with the latest technological developments and instructional strategies, which can influence their ability to effectively integrate ICT into their teaching.

The challenge of time constraints is well-known by 79% of respondents who agree that absence of time is a significant barrier. This offers that teachers often find it problematic to involve in CPD activities due to their existing workload and responsibly. The inability to allocate sufficient time for CPD can lead to limited participation in training programs and reduced opportunities for professional growth in ICT. Time constraints can also affect teachers, ability to implement new technologies in their classrooms, as they may not have the time to implement new technologies in their classrooms, as they may not have the time to explore and test with these tools successfully.

With 97.5% of defendants agreeing that a lack of motivation among teachers and school leaders is challenge, this data indicates that motivation is a key factor influencing the success of ICT CPD when educators and school leaders are not fully involved or committed to ICT training, it can undermine the efficiency of CPD programs. Motivation issues can stem from several sources, including a lack of professed significance or value of ICT training, struggle to change, or scarce reasons. Addressing motivational barriers is essential for ensuring that CPD programs are included and effectively implemented.

The data also tells that 97.5% of respondents believe that insufficient support is a significant challenge. This lack of support may come from various sources, including school administration, technical support staff, or educational authorities. Without adequate support, teachers may face difficulties in accessing and utilizing ICT resources, receiving timely assistance, or implementing what they have learned in training. Support is essential not only for the successful execution of CPD programs but also for the ongoing use and integration of ICT in teaching practices

4.6 Perceptions of teachers on the impacts of ICT pedagogical practices

Thinking about your experiences in school using ICT for teaching and learning process, do you disagree, neither disagree nor agree, agree with the following statements?

Table 5 Perception of teachers on the impacts of ICT pedagogical

1. There was a positive impact on student motivations					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	11	13.6	13.6	13.6
	Neutral	40	49.3	49.4	63.0
	Agree	30	37.0	37.0	92.6
	Total	81	100.0	100.0	
2. You gained access to more diverse or better- quality materials					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	65	80.2	80.2	80.2
	Neutral	13	16.0	16.0	16.0
	Agree	3	3.7	3.7	3.7
	Total	81	100.0	100.0	
3. Your overall workload has decreased					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	10	12.3	12.3	12.3
	Neutral	68	84.0	84.0	96.3
	Agree	3	3.7	3.7	100.0
	Total	81	100.0	100.0	
4. You collaborated more with classmates in the school					

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	64	79.0	79.0	79.0
	Neutral	5	6.2	6.2	85.2
	Agree	12	14.8	14.8	100.0
	Total	81	100.0	100.0	

5. Your administrative tasks were facilitated

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	14	17.3	17.3	17.3
	Neutral	50	61.7	61.7	79.0
	Agree	17	21.0	21.0	100.0
	Total	81	100.0	100.0	

6. There were gains in students learning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	49	60.5	60.5	75.3
	Neutral	20	24.7	24.7	82.2
	Agree	12	15.0	15.0	100.0
	Total	81	100.0	100.0	

7. You resorted to new pedagogical strategies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	68	84.0	84.0	84.0
	Neutral	9	11.1	11.1	95.1
	Agree	4	4.9	4.9	100.0

	Total	81	100.0	100.0	

The above table consists of responses to seven different statements related to the impact of some intervention or change on teachers and students. Here is I proved a detailed discussion of each item.

Positive impact on student motivations: disagree 49.4%, Neutral 37% and agree 13.6%. A majority of respondents (49.4%) disagreed with the statement that there was a positive impact on student motivations, while a significant portion (37%) remained neutral. Only 13.6 agreed. This suggests that most respondents unsure about the effect on student motivation.

Access to more diverse or better quality materials: Disagree 80.2%, Neutral 16% and Agree 3.7%. The vast majority of respondents (80.2) disagreed that they gained access to more diverse or better quality materials. This indicates that the intervention or change did not significantly improve access to materials as perceived by most respondents.

Decrease in overall workload: Disagree 12.3%, Neutral 84% and Agree 3.7%. A small percentage (12.3%) disagreed that their overall workload decreased, while 84% were neutral and only 3.7% agreed. This shows that there was little perceived reduction in workload, with most respondents not experiencing a notable change.

Increased collaboration with classmates: Disagree 79%, Neutral 6.2% and Agree 14.8%. A high percentage (79%) disagreed that they collaborated more with classmates, suggesting that intervention did not lead to increased collaboration. Only a small portion (14.8%) agreed, indicating limited success in fostering collaboration.

Facilitation of Administration tasks: Disagree 61.7%, Neutral 17.3% and Agree 21%. More than half (61.7%) of respondents disagreed that their administrative were facilitated, while 21% agreed. This indicates that intervention did not effectively ease administrative burdens for most respondents.

Gains in student learning: Disagree 60.5%, Neutral 24.7% and Agree 15%. A majority (60.5%) disagreed that there were gains in student learning, with 15% agreeing. This suggests that the intervention did not have a significant positive impact on student outcomes.

Restoring to New Pedagogical Strategies: Disagree 84%, Neutral 11.1% and Agree 4.9%. A substantial majority (84%) disagree that they resorted to new pedagogical strategies, indicating that the change or intervention did not prompt significant shifts in teaching methods. Only 4.9% agreed, showing minimal adoption of new strategies.

4.7 Teachers perceptions on the perceived barriers to ICT use at the school

Table 6 teachers' perceptions barriers to effective ICT use in their schools

1. It is necessary to increase the number of computers per students					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1.2	1.2	1.2
	Agree	80	98.8	98.8	100.0
	Total	81	100.0	100.0	
2. It is necessary to improve ICT training for the school staff					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	81	100.0	100.0	100.0
3. It is necessary to increase the number of computers connected to internet					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	2.5	2.5	2.5
	Agree	79	97.5	97.5	100.0
	Total	81	100.0	100.0	
4. It is necessary to update the digital devices at this school					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	7.4	7.4	7.4
	Neutral	8	9.9	9.9	17.3
	Agree	67	82.7	82.7	100.0

	Total	81	100.0	100.0	

5. It is necessary to develop new teaching practices that involve ICT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	10	12.3	12.3	12.3
	Neutral	15	18.5	18.5	30.9
	Agree	56	69.1	69.1	100.0
	Total	81	100.0	100.0	

6. There is a need for better technical support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	3.7	3.7	3.7
	Neutral	15	18.5	18.5	22.2
	Agree	63	77.8	77.8	100.0
	Total	81	100.0	100.0	

7. There is a need for pedagogical support for the school staff to integrate ICT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	9	11.1	11.1	11.1
	Neutral	8	9.9	9.9	21.0
	Agree	64	79.0	79.0	100.0
	Total	81	100.0	100.0	

Increasing the Numbers of Computers per Student, Disagree 1.2%, and Agree 98.8%. The overwhelming agreement (98.8%) among teachers is that there is a need to increase the number of computers available per student. This strong agreement highlights a critical

barrier: the present ratio of computers to students is likely insufficient, which can hinder effective ICT integration in the classroom. The single rebel opinion proposes that the majority of teachers' identify that more computers are necessary to ensure that each student has adequate access to technology, which is critical for both individual learning and group activities involving ICT.

Improving ICT Training for School Staff Agree: 100%. The common agreement (100%) on the necessity of improving ICT for school staff indicates a clear recognition of the need for enhanced professional development. Effective use of ICT in instruction depends meaningfully on teachers' and staff's proficiency with technology. This consensus suggest that current training programs was insufficient, and there is a strong call for more compressive and ongoing training to equip staff with the skills needed to integrate ICT effectively into their teaching practices.

Increasing the number of computers connected to the internet disagree 2.5%, and agree, 97.5%. a high percentage of teachers (97.5%) agree that increasing the number of computers connected to the internet is necessary. This implies that access to online resources and connectivity is a significant barrier. The low percentage of disagreement indicates that most teachers believe improving internet access is crucial for leverage ICT in education. Adequate internet connectivity is vital for accessing online resources, participating in virtual learning activites, and ensuring that ICT tools are used effectively.

Updating the digital devices at the school: Disagree 7.4% Neutral 9.9% and Agree 82.7%. The majority of teachers (82.7%) agree that updating the school's digital devices is essential, while 7.4% disagree and 9.9% neutral. This recommends that many teachers perceive the current digital devices insufficient for conference modern educational needs. Updating technology can increase functionality, speed, and compatibility with existing software, which is essential for actual teaching and learning. The relatively low percentage of disagreement shows a broader agreement on the need for technological upgrades.

Developing new teaching practices that involve ICT disagree 12.3%, neutral 18.5% and agree 69.1%. a significant majority (69.1%) of teachers agree that there is a need to develop new teaching practices that incorporate ICT, while 12.3% disagree and 18.5% are neutral. This indicates that many educators recognize the importance of evolving teaching strategies to include ICT. The need for new pedagogical approaches reflects the potential of ICT to transform teaching methods and enhance learning experiences. However, the proportion of

neutral responses suggest that the need is acknowledged, there may be uncertainty or varying levels of readiness among teachers to adopt new practices.

Need for better technical support. Disagree, 3.7%, Neutral 18.5% and Agree 77.8%. a substantial majority of teachers (77.8%) agree that better technical support is needed, with only 3.7% disagreeing. This indicates that many teachers face challenges connected to technical issues and want more strong systems. Effective technical support is crucial for troubleshooting issues, maintaining equipment, and ensuring that ICT resources are fully functional and available for use in the classroom.

New for pedagogical support to integrate ICT, disagree, 11.1%, Neutral 9.9% and agree 79%. A strong majority (79%) of teachers agree that there is a need for pedagogical support to help integrate ICT into teaching practices, while 11.1% disagree and 9.9% are neutral. This proposes the while teachers may have access to ICT tools, they lack pedagogical guidance need to effectively integrate these tools into their instructional strategies. Providing targeted pedagogical support can help teachers understand how to use ICT to enhance their teaching and improve student learning outcomes.

Results

1. Accessing Learning Web Portals: Only 2.5% of teachers used learning web portals, primarily due to inadequate digital devices and internet access.
2. Sharing Learning Content: Just 14.8% of teachers shared content with peers, indicating a weak collaborative culture and insufficient digital tools.
3. Searching for Classroom Content: Only 7.4% actively searched for online classroom content, reflecting low digital literacy and resource availability.
4. Searching for Educational TV Programs: 16% sought educational TV programs, but the majority did not, suggesting limited integration of diverse resources.
5. Accessing Educational Portals: Only 3.7% accessed information from educational portals, highlighting a significant gap in knowledge and skills.
6. ICT Training Provided by Schools: A mere 3.7% participated in school-provided ICT training, indicating no ICT training in schools.
7. ICT Training from Government Organizations: Only 2.5% received training due to budget constraints.

8. Self-Financed ICT Training: Only 4.9% self-financed their training, reflecting limited awareness or financial means.
9. ICT Skill Development through Conferences: Just 2.5% participated in conferences, indicating insufficient support for attendance.
10. No ICT Training: 98.8% reported having no ICT training, indicating a critical skills deficit.
11. Perceptions of CPD (Continuing Professional Development):69.1% viewed CPD as essential for ICT skill enhancement, 81.5% believed it improved teaching techniques, and mixed perceptions existed about its impact on assessment practices.

12. Identified Challenges: Lack of ICT Resources: 98.8% cited this as a major barrier, Motivational Support: 97.5% identified inadequate support as an obstacle, Time Constraints: 79% viewed time limitations as significant and Insufficient Training Programs: 97.5% called for more accessible training.

The qualitative result from principals

Role of CPD in Enhancing ICT Integration: CPD provides targeted training for teachers to develop their ICT skills, enabling effective use of digital tools in lesson planning and delivery. It promotes a culture of continuous improvement, keeping educators updated on the latest technological advancements and educational trends. Regular CPD sessions build teachers' confidence and encourage experimentation with new tools.

Influence on Decision-Making: CPD has significantly influenced principals' decisions regarding new technologies, keeping them informed about advanced tools and trends .It helps manage the implementation of new technologies smoothly and aligns these tools with educational goals, fostering a culture of innovation.

Supporting and Mentoring Staff: CPD has enabled the creation of Professional Learning Communities to share best practices and conduct targeted training on technologies like virtual reality and educational apps. A peer mentoring program has been established for personalized support, alongside feedback sessions to refine technology use. These initiatives have enhanced staff confidence and effectiveness in integrating technology into their teaching practices.

Discussion

The integration of Information and Communication Technology (ICT) into educational practices in Wenago Schools was essential for enhancing teaching and learning outcomes. However, the effectiveness of this integration heavily relied on Continuous Professional Development (CPD) for teachers. Observations revealed a significant disconnect between the recognition of CPD's importance and the actual engagement levels among educators. While a substantial 69.1% of teachers believed that CPD was essential for improving their ICT skills and 81.5% acknowledged its role in enhancing teaching techniques, an alarming 98.8% reported having received no formal ICT training. This stark contrast highlighted a critical gap between the perceived needs of teachers and their actual access to professional development opportunities.

Several systemic barriers contributed to this gap. The overwhelming 98.8% of teachers identifying a lack of resources as a major obstacle indicated a fundamental issue within the educational infrastructure. Without adequate access to technological tools, software, and reliable internet, even the best-designed CPD programs could not be effectively implemented. Additionally, 97.5% of teachers cited insufficient motivational support, underscoring the need for a more supportive environment that encouraged professional growth. Time constraints, reported by 79% of teachers, further complicated the situation, as many educators struggled to find the time to engage in CPD activities amidst their teaching responsibilities.

Theoretical frameworks such as Andragogy, Transformative Learning Theory, and Communities of Practice provided valuable insights into the challenges and potential of CPD in this context. Andragogy posited that adult learners, like teachers, were more motivated when training was relevant to their professional context. This highlighted the necessity for CPD programs that were tailored to the specific challenges faced by Wenago educators, ensuring that training was not only applicable but also immediately beneficial. Transformative Learning Theory emphasized the importance of critical reflection, which could lead to profound changes in teaching practices. However, many CPD programs lacked reflective components, limiting their effectiveness and the potential for meaningful transformation in teachers' approaches to ICT integration.

Moreover, the concept of Communities of Practice suggested that collaboration among teachers was vital for professional growth. Yet, the low percentage of teachers sharing learning content (14.8%) indicated a lack of collaborative culture within the educational

community. This lack of sharing could stifle innovation and hinder the collective advancement of teaching practices. Empirical research further revealed a disconnect between training and practical ICT integration; for instance, only 2.5% of teachers utilized learning web portals, suggesting minimal engagement with available digital resources. Findings from Kedir (2023) illustrated that while teachers expressed enthusiasm for the potential of ICT, they often resisted its adoption due to inadequate training and support. This situation underscored the urgent need for CPD initiatives to focus not only on developing technical skills but also on fostering a collaborative ethos within the educational community.

Despite the recognition of CPD's role in improving perceptions of ICT, significant challenges remained in the implementation of CPD policies. Resource limitations were a critical barrier, as many teachers emphasized that without sufficient digital tools and reliable internet access, the effectiveness of CPD training diminished. The decentralized nature of Ethiopia's education system exacerbated these challenges, leading to disparities in access to CPD opportunities across different regions. This inequity resulted in some teachers receiving robust support while others were left without essential training. Furthermore, the absence of robust monitoring and evaluation mechanisms inhibited the ability to assess the impact of CPD initiatives, preventing necessary adjustments and improvements.

Teachers' perceptions of ICT were multifaceted, revealing a complex relationship between their recognition of technological innovations and their willingness to adopt these new tools. Many educators were enthusiastic about the benefits of ICT, yet they often experienced anxiety regarding their competence to use these technologies effectively. This anxiety significantly influenced their readiness to integrate ICT into their teaching practices. The Concern-Based Adoption Model (CBAM) supported this notion, emphasizing that adequate preparation and support were crucial for successful technology implementation in classrooms.

Qualitative feedback from school principals further emphasized the transformative potential of CPD. Well-structured CPD initiatives could provide essential training opportunities that boosted teachers' confidence and knowledge in ICT, thereby enhancing their integration efforts. Establishing Professional Learning Communities through CPD could facilitate the sharing of strategies and experiences among teachers, fostering an environment of innovation and continuous improvement. This collaborative approach not only enhanced individual teacher practices but also contributed to a collective advancement in educational quality.

In conclusion, the literature and findings underscored an urgent need to rethink and enhance CPD programs in Wenago Schools. Future initiatives should have prioritized contextually relevant training that aligned with the specific technological and pedagogical needs of teachers. Improving resource allocation and support was essential to create an enabling environment for effective CPD. Additionally, establishing robust monitoring and evaluation frameworks was crucial for assessing the impact of CPD on teaching practices and student outcomes. By addressing these critical aspects, Wenago Wereda could have significantly improved ICT integration in classrooms, ultimately leading to enhanced educational outcomes for students and a more effective teaching workforce.

CHAPTER FIVE

5. Conclusions, Recommendations, and contributions

5.1 CONCLUSION

In conclusion, the integration of ICT in Wenago Schools presents a transformative opportunity to enhance educational outcomes, but it remains heavily constrained by gaps in Continuous Professional Development (CPD) for teachers. While educators acknowledge the critical importance of CPD in improving ICT skills and teaching practices, the glaring lack of access to formal training underscores a systemic issue that requires immediate attention. The near absence of resources, limited motivational support, and significant time constraints further exacerbate these challenges, impeding teachers' ability to adopt and utilize ICT effectively.

Theoretical frameworks such as Andragogy, Transformative Learning Theory, and Communities of Practice highlight the potential for meaningful CPD interventions. However, the current CPD landscape in Wenago Schools lacks the tailored, reflective, and collaborative elements necessary for transformative professional growth. The findings reveal not only an urgent need for resource investment but also a shift in focus toward creating CPD programs that are relevant to teachers' specific contexts and capable of fostering both individual and collective innovation.

To address these gaps, systemic reforms must prioritize equitable access to CPD opportunities, supported by adequate technological infrastructure and reliable internet. Establishing Professional Learning Communities can foster collaboration among educators, promoting shared knowledge and practices that advance ICT integration. Moreover, robust monitoring and evaluation mechanisms are vital to assess and refine CPD programs continuously, ensuring they remain impactful and aligned with evolving educational demands. By bridging the divide between the recognition of CPD's importance and its practical implementation, Wenago Schools can empower teachers with the skills and confidence needed for effective ICT adoption. This, in turn, will not only improve classroom teaching but also contribute to broader educational equity and quality across Ethiopia, driving long-term benefits for students, educators, and the education system as a whole

5.2 RECOMMENDATIONS

Based on the analysis of the findings, several recommendations can be made:

Invest in ICT infrastructure: increase funding for digital devices, internet access, and computer laboratories in schools to facilitate the integration of ICT into teaching and learning

Implementing comprehensive ICT training programs: educational institutions must develop ongoing and adoptable to the evolving technological landscape, ensuring that teachers acquire the skills necessary to utilize ICT effectively in their teaching.

Provide Continuous support and resources: schools should offer continuous support to teachers in their use of ICT. This might include mentoring, workshops, and access to teaching resources that aid in incorporating technology in the classroom.

Foster a culture of continuous professional developments (CPD): schools should cultivate an environment that values and encourage CPD. This can include setting aside for professional development within the school calendar and offering incentives for teachers who engage in CPD related to ICT.

By addressing these areas, schools in Wonago can work towards creating a more technologically integrated educational environment, ultimately benefiting both teachers and students.

5.1 Contributions

My contribution to theory centers on enhancing the understanding of how Continuous Professional Development (CPD) influences teachers' perceptions and integration of Information and Communication Technology (ICT) in education, particularly within the unique context of Wenago secondary schools. Here are the key aspects of my theoretical contributions:

1. **Integration of Theoretical Frameworks**: I synthesize several theoretical frameworks, such as the Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), and Concern-Based Adoption Model (CBAM), to provide a comprehensive view of the factors influencing teachers' attitudes towards ICT. This integration highlights the complexity of technology adoption and suggests a more nuanced approach to understanding teachers' experiences with ICT.

2. **Understanding the Role of CPD**: my exploration of how CPD shapes teachers' perceptions of ICT underscores its importance in fostering positive attitudes and enhancing technical skills. This contribution reinforces the idea that effective professional development is crucial for facilitating technology integration in teaching and learning.

3. **Identification of Barriers and Challenges**: By discussing the barriers teachers face in ICT implementation—such as inadequate resources and training—my work adds depth to existing educational theories by illustrating how these challenges impact the adoption of technology. This insight can inform both theoretical discussions and practical approaches to overcoming these obstacles.

4. **Conceptual Framework Development**: my proposal for a conceptual framework that links teachers' perceptions of ICT, their attitudes, and the role of CPD offers a structured approach to exploring these dynamics. This framework serves as a valuable guide for future research and helps clarify the relationships between various factors influencing ICT adoption.

5. **Implications for Educational Policy and Leadership**: my analysis of national CPD policies in Ethiopia highlights their impact on teacher development and ICT integration. This contribution informs theoretical discussions about educational

policy, emphasizing the need for alignment between CPD initiatives and teachers' actual needs in the classroom.

By synthesizing empirical research with theoretical insights, my work provides a deeper understanding of the interplay between CPD, teachers' perceptions of ICT, and the systemic challenges that affect technology integration in education, particularly in the context of the Gedeo zone, Wenago wereda of Ethiopia. This contribution not only advances educational theory but also has practical implications for policymakers, educational leaders, and practitioners aiming to improve technology utilization in classrooms.

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APPENDXIS

APPENDIX I: QUESTIONNAIRE FOR TEACHERS

HAWASSA UNIVERSITY

INSTITUTE OF TECHNOLOGY

FACULTY OF INFORMATICS

DEPARTMENT OF INFORMATION TECHNOLOGY

The main purpose of this questionnaire is to assess the perception of school principal have on use of information communication technology for teaching and learning and the role that Continuous professional development had in has in due process in case of Gedeo zone The information that I collect through this questionnaire shall solely be used for the purpose of the research your careful and honest response determines the success of the study. thus you are kindly requested to complete it carefully and honestly. The questionnaire has 5 parts. Thank you in advance for your kindly cooperation!

PART I: GENERAL INFORMATION

Please provide the following information about yourself.

1.1. School where you teach: _____

1.2. Gender:- A) male _ B) female

1.3. Your age range is between: Age category

1.4. A) 18-20 B) 21-30 C) 31-40 D) 41-50 E) 51 and above 60

1.5. Your work experience is in range between:

1.6. A) 1-5yr B) 6-10yr C) 11-15yr D) 16-20yr E) 21 and above

1.7. 1.5. Academic qualification

1.8. A) Diploma B) First Degree (B.A/B.Sc., etc.) C) Second Degree (M.A,

1.9. /M.Sc., etc.) C If Other: _____D) other

PART II: Preparatory activities for ICT use

During the last 12 months (or the 2014 academic calendar), has any of the following ICT preparation activities taken place in this school? Put a tick mark (√) in the tables provided.

No	Item	Yes		No	
		1		2	
1	Access learning web portals.				
2	Share learning content with teachers.				
3	Search for content to use in the classroom.				
4	Search instructive TV programs				
5	Access info and services found on Educational portals.				

Teachers' participation in ICT training in teaching and learning practices

No	Item	Yes		No	
		1		2	
1	ICT training delivered by the school.				
2	ICT training delivered by a governmental organization.				
3	ICT self-financed training.				
4	ICT skill development participation of teachers, sharing experience in conference				
5	I did not take any training on ICT use in teaching and Educational practices.				

Role of Continuous professional Development activity

No	Item	Disagree	Neutral	Agree
		1	2	3
1	Skill Development			

2	Knowledge Update			
3	Building Confidence			
4	Enhancing Problem-Solving Abilities			
5	Keeping Up with Technology			

Challenges of CPD in ICT for teaching and learning

No	Item	**Disagree**	**Neutral**	**Agree**
		1	**2**	**3**
1	Lack of ICT resources			
2	Absence of ICT training			
3	Lack of time			
4	Lack of teachers and school leader motivations			
5	Insufficient support			

Perception of teachers on the impacts of ICT pedagogical

No	Item	**Disagree**	**Neutral**	**Agree**
		1	**2**	**3**
1	There was a positive impact on student motivations			
2	You gained access to more diverse or better-quality materials			
3	Your overall workload has decreased			
4	You collaborated more with classmates in the school			

5	Your administrative tasks were facilitated			
6	There were gains in students learning			
7	You resorted to new pedagogical strategies			

Teachers' perceptions on the perceived barriers to ICT use at the school

No	Item	**Disagree**	**Neutral**	**Agree**
		1	**2**	**3**
1	It is necessary to increase the number of computers per students			
2	It is necessary to improve ICT training for the school staff			
3	It is necessary to increase the number of computers connected to internet			
4	It is necessary to update the digital devices at this school			
5	It is necessary to develop new teaching practices that involve ICT			
6	There is a need for better technical support			
7	There is a need for pedagogical support for the school staff to integrate ICT			

School principals

HAWASSA UNIVERSITY

INSTITUTE OF TECHNOLOGY

FACULTY OF INFORMATICS

DEPARTMENT OF INFORMATION TECHNOLOGY

The main purpose of this questionnaire is to assess the perception of school principal have on use of information communication technology for teaching and learning and the role that Continuous professional development had in has in due process in case of Gedeo zone The information that I collect through this questionnaire shall solely be used for the purpose of the research your careful and honest response determines the success of the study. thus you are kindly requested to complete it carefully and honestly. The questionnaire has 5 parts. Thank you in advance for your kindly cooperation!

PART I: GENERAL INFORMATION

Please provide the following information about yourself.

1.10. School where you teach: _____

1.11. Gender:- A) male _ B) female

1.12. Your age range is between: Age category

1.13. A) 18-20 B) 21-30 C) 31-40 D) 41-50 E) 51 and above 60

1.14. Your work experience is in range between:

1.15. A) 1-5yr B) 6-10yr C) 11-15yr D) 16-20yr E) 21 and above

1.16. 1.5. Academic qualification

1.17. A) Diploma B) First Degree (B.A/B.Sc., etc.) C) Second Degree (M.A,

1.18. /M.Sc., etc.) C If Other: _____D) other

Appendix II interview questionfor school principals: - can you describe the role of CPD in enhancing the integration of ICT into teaching and learning at your school