THE STUDY OF PRIMARY BHUTANESE TEACHERS' PERCEPTIONS AND PRACTICES TOWARDS THE USE OF TECHNOLOGY IN TEACHING

BY

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Abstract

This study was to examine primary Bhutanese teachers' perceptions and practices towards the use of technology in teaching. One hundred and fifteen teachers from 13 primary schools in the Tsirang district took part in the study over the course of a month. The 23-item survey questionnaire was utilized to collect the quantitative data. The semi-structured online open-ended question interview was moderately organized to collect qualitative data. The findings were evaluated using both descriptive analysis and thematic analysis. The results of the survey questionnaire showed that the primary teachers in the Tsirang district had a positive opinion about integrating ICT into their daily teaching. The total mean on the Likert scale, which was 3.7 out of 5, was categorized as "Agree." The findings of the semi-structured online open-ended question interviews with teachers demonstrated their unwavering belief in the significance of incorporating ICT into their daily teaching. Based on the above-mentioned findings, the study revealed that teachers' positive attitudes about integrating ICT into their daily teaching mattered a lot for the life-long teaching and learning process. However, swift action was required on the part of district-level officials and supervisory agencies to ensure that teachers had access to enough ICT resources and programs for professional growth.

(Total 110 pages)

Keywords: Perceptions, Practices, Technology, Primary Bhutanese Teachers

Student's Signature……Thesis Advisor's Signature……

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ABBREVIATIONS

Abbreviations	Meaning
ICT	Information and Communication Technology
UNESCO	United Nations Educational Scientific and Cultural Origination
MoE	Ministry of Education
RUB	Royal University of Bhutan
VLE	Virtual Learning Environment
EiE	Education in Emergency
SIM	Self Instructional Materials
BPST	Bhutan Professional Standards for Teachers
AEC	Annual Education Conference
RGoB	Royal Government of Bhutan
ANOVA	Analysis of Variance
TPACK	Technological Pedagogical Content Knowledge
SAMR	Substitution, Augmentation, Modification, and Redefinition
SRM	Survey Research Method

CHAPTER 1

INTRODUCTION

In this chapter the following contents are included; the research background and rationale, research objectives, research questions, respondents, limitation of the study, variables, location where the study was conducted, time frame, definitions, and the expected outcome of this study.

1.1 BACKGROUND AND RATIONALE OF THE STUDY

There is a growing need to employ technology in enhancing teaching using information and communication (ICT). The chalkboard is being replaced by technology in education. The standard method of educating children all around the world used to be face-to-face teaching in a classroom. However, technology is now heavily incorporated into education. The efficiency of the teachers and the students' academic progress are both directly correlated with the use of technology in the classroom. In today's world, new technology is becoming increasingly prevalent in schooling. The efficiency of teachers and the academic accomplishment of students are directly correlated with the usage of technology in the classroom. Technology use in schools has risen over the last quarter-century, resulting in significant, beneficial improvements in educational environments (Indrasiene, Dromantiene, & Bielskyte-Simanaviciene, 2015). Innovative technology aspects, for example, can make a classroom more interesting, perhaps improving learning and academic achievement (Indrasiene et al., 2015). Thus, ICT is a term that refers to technology devices that is used to prepare data in order to improve customer services, and for better communication. This broad definition of ICT includes radio, television, video, telephone, satellite systems, computer and network hardware, as well as tools and services related to these technologies, such as videoconferencing, email, and blogs (Alkamel & Chauthaiwale, 2018).

According to UNESCO, ICT is ingrained in daily life and is crucial to education (2015). The potential impact of ICT on teaching and learning is at the center of the debate over ICT in education in many nations. ICT is a technology that is used to promote inclusion by enabling people to access information and knowledge, as well as to make education more relevant and controllable, according to the Ministry of Education of Bhutan (MoE) 2014 report. The country's educational practices would change as a result of the usage of ICT in education since it would give people the necessary tools for effective communication.

Given this fact, Wangmo (2021), claims that, regardless of the country's size or population, ICT is a critical skill for citizens to prepare for future tasks, and that if individuals are not given access to technology and knowledge, a learning gap would develop, and the country will fall behind. In order to increase students' academic performance and adapt to the 21st-century teaching style for young learners, the school system and teachers play a crucial role in the development of citizens. The visionary Monarchs of Bhutan place a great value on education because it is so crucial to the development of the country. Citizens are supposed to acquire the information and skills necessary for nation-building through investing in education.

Professional development opportunities are crucial for assisting preservice and veteran teachers in adapting to the varying learning styles of the current generation of learners as a result of the implementation of 21st- century skills and the college and career readiness standards to help students cope with the changes of a global society. In order to execute a curriculum containing technological tools and highly cognitive individualized learning experiences, teachers need intensive training and assistance (Wang, 2002).

ICT training should be required for all levels of school teachers, according to a study by Bhutanese academic Choeda, Penjor, Drukpa, and Zander(2016), who discovered that it has a direct impact on freshly graduating teachers' abilities, which in turn affects classroom practices all over the nation. In order to improve the quality of

education in Bhutan, he suggested that academics at the Royal University of Bhutan (RUB) undergo ICT integration training. In order to satisfy the demands of the 21st-century learning environment, he further recommended that ICT skills be developed and taught in teacher preparation programs at colleges. He also urged that all teachers use ICT in their teaching on a regular basis.

For the purpose of enabling the integration of ICT in their areas of specialization and preparing future teachers, all Bhutanese teacher graduates are required to meet the first level of ICT standards. According to the Education Blueprint 2014–2024 of the Ministry of Education of Bhutan, two teacher colleges of education must be equipped with ICT capabilities. The iSherig Review Report (2018), also recommended that ICT modules be synchronized across both educational institutions, Samtse College of Education and Paro College of Education. In 2008, Moodle, a VLE (Virtual Learning Environment), was made available in the colleges of the Royal University of Bhutan (RUB). As a result of their improved familiarity with ICT technologies, teachers are now moving towards integrating ICT in their teaching practices. However, the application of ICT-integrated pedagogy in Bhutan's higher education system is currently being hampered by poor internet connectivity, a lack of adequate resources, and a lack of expertise in the field. However, the potential of technology is a big source of incentive for lecturers. Kinley, Zander,Georgsen,and Choeda (2013), noted that there are challenges with the integration process, including "lack of skills," "internet connectivity," "lack of training," and "lack of necessary resources."

In actuality, this tendency is seen in Hinostroza's work as well. Hinostroza (2017), observed that the widespread availability and use of ICT in society is motivating teachers to employ these technologies in their teaching and learning processes in his study titled "The Need to Account for the Widespread Use of ICT for Teaching and Learning Outside the School." Data point to the lack of digital skills among many teachers, which restricts the potential influence of modern technologies, can harm students' learning, and can exacerbate educational inequalities. The recent

rapid social progress around the world, including Bhutan, has forced individuals and educators to alter their expectations. Another researcher also stated that the introduction of ICT into the educational environment has increased teachers' digital competence, which is one of the educational challenges instructors currently face for lifetime learning and teaching (Artacho, Martnez, Martn, Marn, & Garca 2020).

Technology has become more prevalent in education as a result of major ICT expansion and advancement, claim Gebremedhin and Fenta (2015). The majority of teachers are unable to use hardware in the teaching-learning process due to a lack of resources, according to teachers' self-efficacy in using technology in the teaching-learning process. ICT is a strong force that has significantly changed many aspects of our lives. It is crucial to many industries, including law, banking, engineering, architecture, medical, tourism, and business. Over the past two or three decades, ICT has had a significant impact. Due to the rapid advancement of technology, these sectors now operate fundamentally differently than they did in the past. Contrarily, as it propels a country toward technological innovation and economic development, education is one of the most important investments in that country's human capital.

A teacher may simply construct lesson plans and design a variety of activities using materials to facilitate content delivery and make lessons effective for everyday classroom teaching-learning using ICT. Mailizar, Almanthari, Maulina, and Bruce (2020), the word ICT has captured the attention of the globe in recent years because of an unanticipated pandemic, and all sorts of services are given using ICT, including teaching, and learning for improved student engagement. They did say, however, that there are two learning barriers: ICT resources as a material barrier and teachers' knowledge and skills in using ICT as a nonmaterial barrier that obstructs teaching and learning services.

Similarly, MoE, Bhutan (2014), ICT Master Plan, acted as a road map for guaranteeing equitable access to high-quality education and achieving the desired learning outcomes. Teachers' knowledge, abilities, and attitudes toward incorporating

21st-century technology skills are critical in creating an effective daily teaching-learning process. Following the successful completion of iSherig-1, the Ministry of Education developed iSherig-2, an ICT Master Plan for Education that focuses on developing and using digital capacities to improve teaching quality (iSherig MoE, 2019). The effective use of ICT in teaching depends on teachers' preparedness and good attitudes (Sing,2014).To facilitate online teaching and learning, the teachers were given content and pedagogical links. Until 2019, teaching and learning were placed within the four walls of the classroom, using textbooks, chalk, and a chalkboard.

The Ministry, on the other hand, did not stop planning during the COVID-19 outbreak and promptly devised a system to continue education known as Education in Emergency (EiE). The Ministry of Education began offering online courses using social media, Self-Instructional Materials (SIM), video, and audio courses, as well as psychotherapy through Sherig Counseling Services, to encourage learning continuity, student participation, and support (MoE, 2021). Despite the Ministry of Education's numerous endeavours, the use of ICT in the classroom remains a major obstacle for teachers because of unavoidable conditions.With the rapid advancement of technology in today's world, untold amounts of innovative teaching are taking place all over the world, including Bhuatn. Due to their limited experience with technology, this study will focus more on how Bhutanese teachers are coping with ICT obstacles and ICT practices in daily teaching.

According to Takehiro (2015), the Third Druk Gyelpo Jigme Dorji Wangchuck oversaw the spread of Bhutan's modern education system, which was officially approved in the country's first five-year plan in 1961. As a result, Bhutan is a relatively young modern nation on the planet, with modern schooling only starting in the 1960s. ICT is frequently regarded as one of the most important and effective tools for enhancing teachers' skills and teaching techniques.

The following speech was given by His Majesty on behalf of the faculty and students at the Royal University of Bhutan's 3rd Convocation on February 17, 2009: "I

am here today to speak for our students and teachers. Our students will always be hardworking and obedient, and our teachers will always be committed, dedicated professionals."

The iSherig (MoE, 2014), ICT Master Plan was created by the MoE and served as a roadmap for ensuring that all students have access to high-quality education and achieving the required learning goals. According to the Bhutan Professional Standards for Teachers (BPST) 2020, teachers' steadfast love of learning, deep affection for their students, and unwavering conviction that education can change lives are what lead to effective classroom management and in-depth subject knowledge. The two most important elements of the BPST in the area of ICT are the Positive Use of ICT and ICT as Teaching Learning Resources. The BPST uses a seven-point framework to define teacher quality and completely takes into account both teachers' professional and personal actions. However, based on the results of iSherig-1(2014), it is determined that universal, one-time teacher training has no appreciable, long-lasting impact on teachers' ICT activities. A school survey was part of the iSherig 1 study, and the findings indicated that 47 percent of schools lacked school-based ICT training for teachers, which had a detrimental effect on the teachers' ICT competency. In order to equip professional teachers with the ICT skills they need to combat 21st-century education and accommodate digital natives, the researcher conducted more research as a result of this discovery.

According to Dorji (2021), Bhutanese students and teachers have been exposed to ICT skills since the debut of gateway computers in 1980. Some schools offer ICT as an elective subject, and between 2009 and 2013, all Bhutanese teachers received basic ICT literacy training. The 16th Annual Education Conference (AEC) resolved that ICT should be adopted in all schools to scale up ICT skills and improve teaching and learning techniques in order to further improve ICT capabilities. But his research showed that, in many Bhutanese schools, teachers were found to be unqualified to use ICT in regular classroom teaching, and that it was challenging for teachers to communicate information to their students due to a variety of factors, including

classroom size, a lack of teaching-learning resources, and limited access to technological materials, making it difficult for teachers to share their knowledge.

To keep up with the advancements of the modern world and inspire kids to learn, the Ministry of Education and teachers wanted to use new facilities. Since 2001, Bhutan has used information and technology into the curriculum to raise the standard of education. 2016 (Phuntsho), Due to the challenging physical environment and other circumstances, most schools lack technology facilities, in contrast to other developed nations. Additionally, study was done with regard to Bhutanese teaching and learning, particularly in the area of technology.Thus, given the above discussion, it is evident that there are indeed teachers all over the world including Bhutan who are experiencing technical difficulties in teaching. Teaching in Bhutan is still dominated by chalk and chalkboard. This conventional teaching style is tedious for both the teachers and the learners.However, the breakout of the honorable COVID-19 pandemic had taught everyone the value of ICT for daily life, as well as how to make teaching and learning uninterrupted and how to meaningfully involve students from their homes. These experiences, therefore, provided guidance to the Ministry of Education to concentrate on ICT to reach the hard-to-reach learners at any time and meet educational objectives for learners. As a result, starting in 2021, the Ministry of Education placed a strong emphasis on ICT integration at the Primary level. In order to provide innovative techniques, primary schools in Bhutan will try to close the technology gap by integrating the use of modern technologies into learning and teaching.

According to Dorji 2021, the Ministry of Education provided basic ICT training for all levels of Bhutanese teachers under the Chiphen Rigphel Project from 2009 to 2013, but his study from that year found that many teachers are still unable to employ ICT skills in their plan activities. The researcher became intrigued by this finding and began looking for novel approaches to narrow the gap. However, the majority of Bhutanese ICT research had focused on broad ICT findings for middle school levels of education. Gyelsthen, 2021, performed a study with 329 middle

secondary school teachers in Bhutan and came to the conclusion that using ICT is a key way to encourage innovation. However, it is challenging to include ICT in teaching without sincere interest from teachers. Teachers speed up the digitization of the teaching and learning process in classrooms.It is up to school administrators to decide whether to integrate ICT into the curriculum and teaching. However, technological innovation is still lacking due to individual teachers' perceptions, and practices.

Since primary schools were thought to be the starting point for young students' brain development, they were required to acquire rudimentary ICT usage skills in their regular classroom teaching and learning process. The researcher was intrigued to conduct additional research to close the gap for better performance of the teachers in the use of ICT tools in teaching in Tsirang, District, but in-ground reality the ICT implementation in classroom teaching is minimal, and the researcher was unable to obtain local research materials to provide concrete justification.

Researchers being noble primary teaching practitioners for the last 19 years received ample firsthand experience that the Bhutanese primary teachers in the school are facing difficulties to use ICT tools in their teaching, due to many factors. Without a doubt, teachers' usage of ICT in teaching is a recurring problem for many Bhutanese primary teachers which will affect their teaching. Although ICT usage in Bhutanese classroom teaching was introduced in 1980, as of today Bhutanese scholars did not attempt much to study the usage of ICT in teaching and have limited data for references. Additionally, the researcher, a certified primary school teacher, focused primarily on primary teachers. It is in this context that the researcher hopes to understand how primary Bhutanese teachers feel about and use technology in the classroom. This puts the researcher in the best possible position to suggest some alternatives.

Thus, author has gained a clear understanding of how primary teachers in Bhutan are able to incorporate technology into their daily teaching, the difficulties

they have faced in the real world, and how to get the necessary support from the appropriate agency to upskill teachers and create opportunities for lifelong learning.

This may also assist in giving policymakers and school administrators a trustworthy data source to encourage teacher upskilling in the area of ICT for better student results. There isn't enough data to paint a clear picture of how ICT is actually being used in primary school teaching. By examining how teachers view and use ICT in teaching and learning, the researcher hoped that the current study will close the gap.

1.2 RESEARCH OBJECTIVES

1.2.1 To examine primary Bhutanese teachers' perceptions toward the use of technology in teaching in Tsirang district, Bhutan.

1.2.2 To find out the primary Bhutanese teachers' practices toward the use of technology in teaching in Tsirang district, Bhutan.

1.3 RESEARCH QUESTION

1.3.1 What would be the primary Bhutanese teachers' perceptions of the usof technology in teaching?

1.3.2 What would be the primary Bhutanese teachers' practices towards the use of technology in teaching like?

1.4 RESPONDENTS

The respondents of this study were professional Bhutanese primary teachers. There were 115 respondents (Refer to Appendix A) from 13 primary schools that were serving in different locations within Tsirang district, Bhutan.

Table 1.1 Profile of the research respondents' demographics

Items	Male	Female	Total
No. of respondents’	81	34	115
Percentage	100	100	100%
Teaching Experiences	1 to 31 plus years		

1.5 LOCATION OF THE STUDY

The study was carried out in Tsirang districts in Bhutan for 115 teachers, 80 males, and 34 females from 13 Primary Schools.

Figure 1.1 A map of Bhutan showing the research site.
Source: Royal Government of Bhutan (RGoB), 2019

1.6 CONTENT OF THE STUDY

Before the real survey for data collection, a pilot survey test was conducted in another nearby district school. This study employed both quantitative and qualitative data, which was secured via the use of well-built research instruments. The data was collected using the following study instruments:

1) Questionnaire

2) Semi-Structured online open-ended question interviews

All 115 teachers from 13 primary schools were chosen as respondents for the quantitative data collection, and 26 volunteer respondents were chosen for the semi-structured online open-ended question interviews. However, it was the school principal's duty to propose one male and one female respondent from each school to fairly represent all respondents in the survey. To address the study questions, the acquired data were analyzed, combined, and evaluated using computer programs, descriptive Statistical Analysis, and Thematic Analysis.

1.7 TIME FRAME

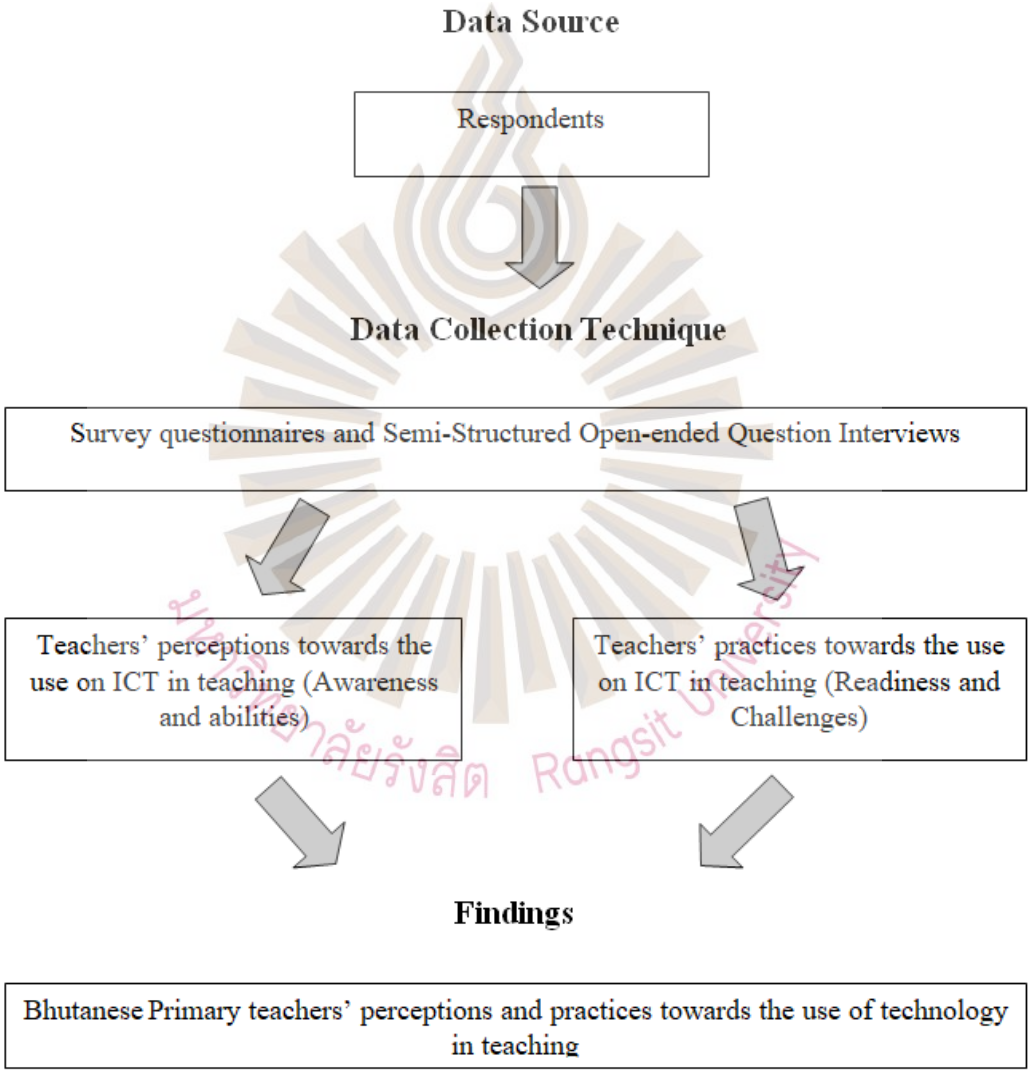
The study was conducted from July 10, 2022, to August 20, 2022. All the teachers from 13 primary schools of Tsirang districts participated in online questionnaire interviews and 26 teachers took part in the online semi-structured open-ended question interviews based on volunteers. Table 1.1. Describe the specifics of the research process' time frame.

Table 1.2 The research process' time fram

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Literature Review										
Research Proposal										
Data Collection										
Data Analysis										
Final Defense										

1.8 CONCEPTUAL FRAMEWORK

The data for this study came from the respondents and the documents. Semi-structured open-ended question interviews and online survey questionnaires were used to gather the data. These tests were designed to learn more about how primary teachers' perceptions and practices towards the use of technology in teaching.Figure



1.2 Representation of the framework.

Figure 1.3 Conceptual Framework

Source: Adapted from Denkar, & Chalermirundon, 2020

1.9 LIMITATIONS OF THE STUDY

Since the study was only conducted in one district in Bhutan's southern region, its conclusions cannot be applied to all of the country's primary school teachers. Other stakeholders, such as teachers at junior high, middle high, and secondary high schools, who could have confirmed teachers' impressions and ensured the validity of the results, could not be included in this study.

1.10 VARIABLES

The researcher used independent and dependent variables in this investigation. The primary teachers' use of technology for instructional purposes was an independent variable, while the teachers' attitudes and practices towards the use of technology in the classroom were dependent variables. With the use of these variables, it was possible to learn how people felt about utilizing technology while also learning about their habits and the difficulties they encountered.

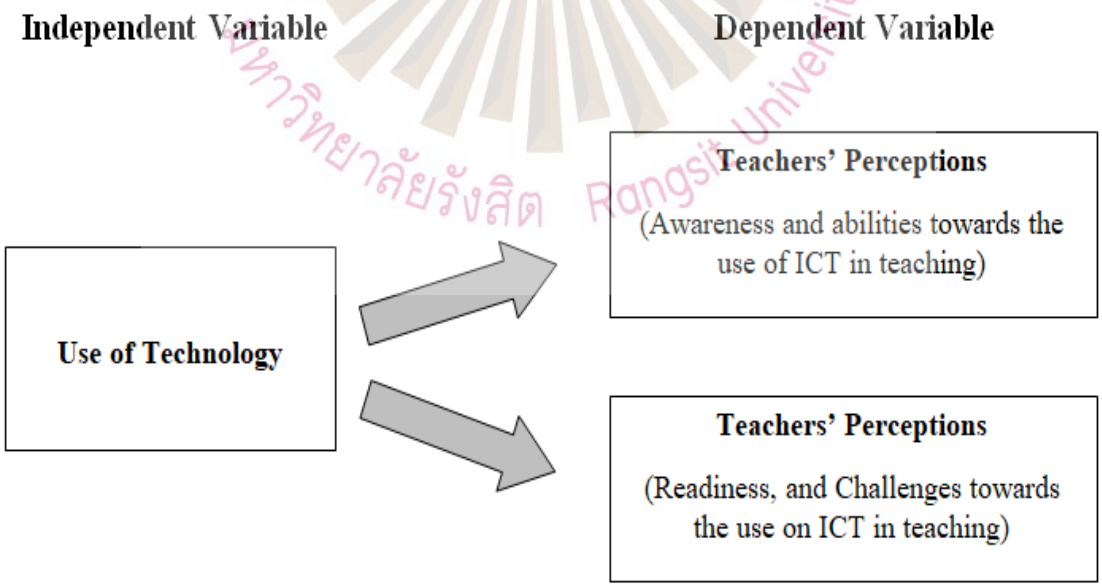


Figure 1.4 Independent and Dependent Variables.

1.10 OPERATIONAL DEFINITIONS

In this investigation, the following terms were employed**.**

Bhutanese teacher refers to qualified primary school teachers from Bhutan who teach Pre-Primary (PP) to Class VI students in the Tsirang District's 13 different primary schools.

Perceptions It is crucial to take into account the understanding and proficiency of primary Bhutanese teachers in ICT in order for teachers to integrate ICT into their regular teaching and boost student performance.

Awareness refers to the awareness that teachers have of their own use of ICT resources.

Abilities addressed the question of whether teachers has the abilities and know-how to utilize ICT tools in their teaching.

Practices refers to the ability and difficulties of primary Bhutanese teachers to use ICT tools such PowerPoint presentations, a projector, a TV, Microsoft Word, YouTube, and video animation to engage the students.

Readiness refers to teachers' whether they can operate the ICT tools for their teaching learning purposes.

Challenges: refers to teachers what kind of ICT implementation problem they face while they are teaching.

The use of Technology: refers to the ICT skills and technology that Bhutanese primary school teachers adopted in their teaching to make them more interesting and successful. ICT tools such as social media for communication, PowerPoint

presentations, and audiovisual ways to effectively deliver teaching and actively involve learners to increase their learning.

Teaching refers to teachers using ICT tools to give their lessons and share important content subject knowledge with their students.

1.12 SIGNIFICANCE OF THE STUDY

1.12.1 It would provide the awareness, abilities, readiness and challenges of primary Bhutanese teachers' perceptions and practices toward the use of technology in teaching in Tsirang districts.

1.12.2 It would inform the school management and policymakers regarding the need for technical support that is required by the teachers to improve their ICT skills of teachers and to enhance their teaching skills.

1.12.3 It would provide data for future researchers in the same field of study.

CHAPTER 2

LITERATURE REVIEW

This chapter offers a review of the literature on the use of technology in the classroom, its limitations, and teachers' perceptions and practices. It also discusses the study's theoretical background.

2.1 SCHOOL PROFILE OF ONE OF THE SOUTHERN DISTRICTS IN BHUTAN, TSIRANG DISTRICT

With 5802 students and 313 teachers spread throughout 17 schools, this district includes two middle secondary schools, two higher secondary schools, and 13 primary schools . However, only 115 primary school teachers will be surveyed in order to learn more about their perceptions and practices about the use of technology in their teaching. (For more details, see Appendix B.)

2.2 TECHNOLOGY AND BHUTANESE EDUCATION SYSTEM

Our educational system is using more and more technology. Technology use in the educational system is a regular aspect of daily operations. The use of technology in regular teaching is to ensure that learners are prepared to compete in a globally competitive market. Bhutan has progressed much in defining and rethinking its educational policies, strategies, and practices. A more relevant and contextualized educational system has emerged as a result of the introduction of more flexible and up-to-date academic courses (Subba et al., 2019). Bhutan's education system is now organized into three categories: general, monastic, and non-formal education. The most important one is general education, which has become widely recognized as the official educational unit as a result of the use of ICT into teaching.

(Gyeltshen & Dorji, 2020), ICT in Bhutanese education is still viewed as being in the implementation stage, due to a number of problems. The primary topic of discussion in this study will be how teachers use ICT in their regular lessons and how they perceive and use it.

Teachers must be capable of integrating technology into the teaching and learning processes in order to enhance the learning environment and the academic development of students (Office of Educational Technology, 2016). Without teachers, the teaching and learning process would not be possible. The way a teacher views the subject matter has a significant impact on how technology is integrated into the learning process. Numerous studies list a number of factors that affect teachers' daily use of technology in their teaching.

Although there are numerous aspects that contribute to effective technology integration, teacher competency and the capacity to integrate technology resources and a rich curriculum in technology into the learning environment are the most crucial ones (Gorder, 2008). Despite the rising investment in technology in teaching and the need to integrate technology, computers are rarely or never used in most schools (Becker, 2000; Cuban, 2001). Finding techniques to encourage the use of technology in teaching has proven to be fairly impossible for the majority of teachers.According to Ertmer (2005), teachers lack the technical knowledge and abilities necessary to successfully incorporate technology in order to facilitate teaching and learning, regardless of their level of expertise. Many studies have identified a variety of factors that affect teachers' use of technology in the classroom.Conflicting views on the value of technology, the dynamic nature of technology, and their attitude toward technology are some of the contributing causes (Zhao & Frank, 2003). The teacher's belief system is one important obstacle to technological integration. Many teachers limit their use of technology in the classroom by using it for administrative activities or to improve the traditional manner of delivering teaching.

It is critical to change the assumptions and practices of traditional teaching methods in order to integrate and employ technology tools in the learning environment (Rehmat & Bailey, 2014). Technology proficiency and the use of subject-matter expertise through best practices are required to promote effective teaching and learning.

2.3 DEFINITION OF INFORMATION AND COMMUNICATION TECHNOLOGY

ICT deployment in the educational system is widely used worldwide, especially in Bhutan, for effective teaching. Bhutan is a landlocked nation that is bordered to the north and south by China and India, respectively.Bhutan was difficult to access to the rest of the world in the past, but thanks to globalization and technological advancements, Bhutan can now connect to the rest of the globe for improved communication and human development. As a result, ICT is seen as a crucial tool in teaching and education.

According to Asabere and Enguah (2012), ICT refers to the devices, infrastructure, procedures, and tools that provide the physical support and services needed for the creation, transmission, processing, storing, and disseminating of information in all forms, including speech, text, data, images, and video. Computers, software, office supplies, downloadable programs from the Internet, mobile phones, electronic dictionaries, digital cameras and videos, recorders, document cameras, and data projectors are just a few examples of ICT. Information and communication technologies are the means by which information is managed, produced, and disseminated (Yunus, Nordin, Salehi, Sun, & Embi, 2013). Al-Rahmi, Alzahrani, Yahaya, Alakwan, and Kamin (2020), expressed ICT software, hardware, networks, and media as the heart of ICT, and they are used to collect, present, process, store, and transfer information via speech, data, text, and pictures, as well as provide other services.

2.4 TEACHERS' PERCEPTIONS TOWARDS THE USE ON ICT IN TEACHING

Akram, Abdeleady, Al, and Ramzan (2022), The results show that teachers have good attitudes toward using technology in teaching and learning. They believe that incorporating technology into the classroom enables them to enhance their teaching methods, create compelling, participatory learning experiences, and keep students motivated. ICT has a profound impact on all spheres of human life nowadays as a necessary component (Gnambs, 2021). ICT has improved educational processes by making them more engaging and effective (Lin et al., 2017), similar to how it has transformed other industries. This is because it offers a variety of tools that are used in both traditional and online learning environments and help create a proactive learning environment (Jogezai et al., 2021). Technology-integrated instructional strategies, according to Akram,Yingxiu, Al-Adwan, and Alkhalifah (2021), not only enhance the quality of instruction but also provide students with the chance to successfully develop their skills, become more motivated, and increase their knowledge and information. When all activities worldwide in all spheres of human existence became constricted due to the COVID-19 global crisis, ICT played a supporting role in maintaining teaching-learning activities (Thaheem, Abidin, Mirza, & Pathan, 2021). However, ICT-integrated teaching and learning provided a flexible approach and greater access to learning opportunities as an alternative for in-person teaching (Akram, Aslam, Saleem, & Praveen, 2021).

It is imperative to remember that teachers' attitudes have a significant impact on the success of ICT education in a number of different ways (Kusano et al., 2013). Voogt (2010), asserts that teachers who frequently incorporate technology into their classes have a high level of pedagogical confidence and strongly value a learner-centered approach. Those who frequently use technology engage in more professional development activities and collaborate with their peers than teachers who don't. Other studies show a connection between teachers' use of technology and their educational principles (such as their philosophies of teaching and learning). If schools wish to change teachers' perspectives, they must develop skilled leaders. Additionally,

administrators in schools should act as office managers and personal counsellors for certain teachers and staff members (Kim, C., Kim,M., Lee, Spector, & DeMeester, 2013).

Pre-service teachers' expectations, attitudes, and beliefs towards the accessibility and usage of ICTs were examined by Martinovic and Zhang (2012), as well as their perceptions of these elements. The main conclusions were that future teachers, irrespective of their level of proficiency, lacked adequate familiarity with ICT; they had high expectations for what it would be like to learn and teach using ICT; and access to ICT was restricted in schools. Ndibalema (2014) claims that while African teachers had positive views on the use of ICT as a pedagogical tool, they did not successfully integrate it into their lessons. It was also found that the lack of experience teachers had using ICT as an educational tool was a problem.

Teachers who were confident in their abilities to use technology did so to the benefit of their students, regardless of its availability (Wastiau et al., 2013). The key drivers of technology integration and a determinant in students' confidence in utilizing it were teachers' confidence and their conviction that technology was beneficial for students' learning (Al-awidi & Alghazo 2012; Wastiau et al., 2013), Strong cultural and educational traditions, subpar hardware and software, worries and reluctance to use ICT, a lack of ICT framework and curriculum guidance, ineffective ICT training, and a lack of technological and pedagogical knowledge and skills that can fully integrate ICT are all barriers, according to Dong (2014).

Eyiuche (2014), cited challenges include a lack of ICT infrastructure, assistive technologies, skilled ICT teachers, computer illiteracy, fear of new technology, students' limited access to personal computers, internet services, and the World Wide Web, as well as issues with equality.The government should start on a huge Computer training program for teachers through seminars, workshops, and conferences, among other things, based on the findings, which promotes equity in educational opportunities at all levels of lifetime learning.

According to the study, the ICT policy had a positive effect on curriculum creation and teaching techniques in two rural primary schools in Uganda. The study revealed that a number of problems, including weak ICT infrastructure in the villages, insufficient electricity, limited internet connection, and low digital competence among instructors, were undercutting the beneficial effects of ICT policy on curriculum development and classroom practices. In light of this, it implies that the government should take the required steps to address these issues in order for digital literacy to establish itself in Ugandan education over the long term.To create real educational transformation in Uganda, further research will be required to discover acceptable solutions for addressing these difficulties (Samuel, 2014).

The use of ICT tools for student-centered education is significantly influenced by teacher professional competency and perceptions of ICT benefits, according to Yamaguchi and Takada (2018). Teacher cooperation also has an impact on teachers' perceptions of using digital content for student-centered education, as well as endogenous teacher-level factors like job satisfaction and self-confidence. A more subtle influence was found to be the "top-down" technique, which deprives teachers of autonomy and creates negative teacher impressions of the benefits of using digital technology. Investigating the advantages of employing digital technology in education reveals a lack of knowledge regarding these advantages, as well as the enormous number of resources and programs available to support child learning. Few resources are used, and those that are are frequently ineffective. How could teacher training in the use of ICT for teaching be made more effective? Teachers seem to "not know what there is to know" as a result of ineffective professional development.The findings suggest that teachers can be informed and supported in ways other than through standard professional development (Jean, 2019).

It's important to comprehend the variables that influence how teachers use technology. The current case study examines the variables influencing teachers' usage of technology in the classroom and involved 70 Turkish EFL professors. It especially examines the attitudes and levels of comfort that instructors have with using computer-based technology in the classroom, as well as their familiarity with software

applications and patterns of computer use. According to an examination of survey data, teachers are confident in their ability to incorporate technology into their lessons, have good attitudes toward using it in the teaching, and enjoy a supportive environment at work. However, they feel minimal support from the administration, especially in terms of the availability of technology resources and motivation for teaching. The study's findings have implications for how technology is integrated into the classroom since they show that teachers require adequate technology as well as administrative and technical support.

Rana (2021), investigates teachers' impressions of their training to use current educational technologies in instructional activities in rural primary schools. According to the findings, none of the teachers had ICT training during their first teacher education, and the government has authorized nongovernmental organizations to give ICT infrastructure and training to rural schools and teachers. Although this is a short study, it sheds light on the gap between policy and practice, as well as the contextual obstacles that Nepal's aspirations to operate on a global educational level pose to teachers.

According to Koro (2012), a model of the various elements influencing teachers' use of ICT in the classroom and educators' attitudes and views on the use of ICT in education. The model suggests that the strongest influences on ICT use are perceptions that ICT is a good tool for teaching and learning and a high level of self-efficacy in utilizing computers in education. Additionally, it appears that teachers' positive attitudes toward ICT have no effect on how much ICT they utilize in the classroom. Focusing on self-efficacy and making a distinction between specific and general attitudes about ICT use are important aspects of the current study. It is believed that attitudes and self-efficacy are related.

In order to successfully integrate the content that may be taught, the roles that teachers play in putting the curriculum into practice require a specific level of understanding (Sekoaila & Adebesin, 2016; UNESCO, 2015). ICT integration into teaching and learning processes requires teachers to obtain a specific level of diverse

abilities to handle the obstacles associated with doing so, similar to other disciplines they distribute (Igbo & Imo, 2017). The theoretical framework known as Technological Pedagogical Content Knowledge was established to better comprehend the knowledge teachers require to integrate ICT into teaching and learning processes (Koehler, Mishra, Kereluik, Shin, & Graham, 2014). Varol (2013), discovered a link between elementary school teachers' use of technology but instead their views about it. One hundred primary school kids were invited to complete surveys about their ICT knowledge, usage, and attitude toward technology to achieve this goal. The findings reveal that teachers' ICT understanding and use are quite limited. Additionally, they have a moderate view on technology. Teachers' views toward technology and confidence in using it in the classroom are predicted by their ICT participation.

Sipila's (2014), study looked at teachers' viewpoints on how ICT is being used in teaching and learning, their level of digital competence, and what reasons, in their opinion, are limiting the use of ICT in schools. There were 292 Finnish teachers that responded to the poll. It was decided to use Activity Theory as an educational framework. Descriptive statistics, frequency distribution, cross-tabulation, and theme analysis were used to quantitatively examine the data. The results show that teachers who possess advanced ICT abilities are more inclined to use ICT in the classroom. Most teachers are not equipped with the tools and knowledge needed to fully employ ICT in the classroom. Official organizational structures of educational institutions and actual classroom activities continue to be inconsistent.

Afamasaga-Write (2010), asserts that the use of technology in the classroom will depend on how teachers use it and how they view it. Levin and Wadmany (2016), discovered that teachers' conceptions of teaching and learning changed over the course of three years in a technologically sophisticated environment, and these changes were reflected in altered classroom behavior. They found that when teachers' views evolved, so did their perceptions of how technology fit into the teaching and learning process. However, Brill and Galloway (2012), looked into how lecturers used and perceived technology in the classroom and found that they believed it had a detrimental impact on student learning.

According to Borich (2014), teachers' favorable attitudes and perspectives about using ICT are crucial for effective ICT integration into the teaching and learning process. Therefore, it is possible to comprehend the challenges to the successful integration of ICT into the teaching and learning process by carefully examining teachers' perceptions. It is well established that teachers' attitudes, perceptions, and beliefs about ICT have a significant impact among these variables. It is therefore feasible to draw the conclusion that the attitudes, perceptions, and beliefs of teachers may affect how well ICT is incorporated into the teaching and learning process.

2.4.1 Teachers' Awareness Towards The Use Of ICT

According to Dastjerdi (2016), teachers' opinions toward various ICT features, such as the simplicity, usefulness, and effectiveness of using ICT in education, play a significant role in how they use the technology. It shows that teachers who have a more positive outlook on the application of ICT in education have made use of it in their classes. In other words, teachers' use of technology will increase as their perspectives on its use change, and vice versa. The results showed that the usage and application of ICT in the classroom is significantly influenced by the availability of ICT in schools, the literacy and informational skills of students (their preparedness), and the attitudes of teachers toward using ICT in the teaching-learning process.

ICT has reportedly had a significant role in the global revolution in education, according to Khokhar and Javaid (2016). Pakistan has greatly increased its use of ICT during the past ten years. The most current educational strategy of the Pakistani government places a strong emphasis on ICT usage in the classroom. The curriculum resources urge teachers to use ICT into their lesson plans and student activities. The study is restricted to Pakistan's four largest cities and focuses on ICT use in Pakistani schools. The study examines how teachers and students use ICT in daily life. The study explores students' perceptions of teachers' use of ICT for teaching, learning, and evaluation in the classroom. According to the poll, both students and teachers have access to computers in their classrooms and at home, and they use them for a range of activities, including communication, education, and enjoyment. The study also

identifies differences in how and when technology should be used in the classroom between teachers and pupils. The study reveals two competing points of view. Students don't agree with their teacher's assessment of the use of ICT in the classroom, despite the fact that teachers think they are utilizing it effectively. In this study, the adoption of ICT for learning and teaching in Australian and Saudi Arabian elementary schools is compared for similarities and differences. (Jafar, 2017).

To fulfill the 21st-century expectations for innovation and creativity in teaching and learning, learning is not only limited to the four walls of the classroom and time, but it may also read material online at any time through computers and cellphones (Wahyudi, 2019). Learning ICT skills on its own is insufficient; ICT integration into the teaching and learning paradigm, however, improves the idea and execution of teaching and learning. Today, ICTs are causing rapid changes. Every area of human life is influenced by them. The overall picture has changed as a result of the use of technology in teaching and learning.This means that the teaching and learning processes are no longer restricted to the classroom. ICTs are changing the way students learn and how teachers educate. However, little is known about how teachers' perceptions influence how they control their own learning. (Kingsley & Patience, 2019).

Rwanda (2020), stated that like many other developing countries incorporated ICT into their educational systems. According to Kouider and Zoulikha (2021), a significant amount of research has been done recently on the use of ICT in the teaching and learning process. Numerous types of study have emphasized the benefits of ICT for teachers and students. However, little is understood about the key factors influencing teachers' attitudes about using ICT in their instruction. Five independent variables—human characteristics, computer characteristics, cultural perspectives, computer skill, and computer access—were compared in the study.

2.4.2 Teachers' Ability In ICT

The effectiveness of teacher preparation is determined by a teacher's capacity to integrate ICT into their lessons. Like any other professional competency, teacher educators must develop and demonstrate ICT skills if they want to integrate ICT into education effectively (Ministry of Education, Bhutan, 2019).

According to Bariu (2020). In a high-quality 21st-century education system, ICT infrastructure can play a critical role in improving teaching, learning, and evaluation methods for teachers and students. It is widely acknowledged that teachers and schools are always working to improve how they teach, how their pupils learn, and how learning is assessed around the world.

According to Louws, Meirink, Veen, and Jan (2016), structural and cultural working conditions in schools have been found to have an impact on how teachers learn (e.g., learning resources and professional development policies). Professional learning environments can either support or hinder learning for teachers, depending on how those environments are seen by the teachers. A group of 31 teachers from two secondary schools were used to select the four cases, and they were assessed based on how much their work environment aided or impeded their learning. Our results indicate that teachers' perceptions of a common vision and professional discourse in their schools, as well as specific classroom-based issues, are related to the content of their learning goals. Additionally, rather than their perceptions of structural conditions, teachers' assessments of cultural workplace conditions and supportive leadership practices tend to have a higher impact on self-directed learning.

2.5 TEACHERS' PRACTICES TOWARDS THE USE OF ICT IN TEACHING

In their 2013 study, Ali, Haolader, and Muhammad showed a strong desire to include ICT into the teaching-learning procedures used in classroom settings. ICT has

transformed every industry; among the enhancements it has made to the teaching-learning process are online student registration, instant access to information, a reduction in the workload associated with maintaining hardcopies all the time, networking with resourceful individuals, and e-learning. ICT is now pervasive in all aspects of life. The processes and procedures of virtually every form of business and government endeavor have undergone significant change during the last 20 years as a result of the use of ICT. Although less so than in other fields, ICT has started to have A excellent education has always been correlated with good teachers who spend a lot of one-on-one time with students. an impact on education.

ICT use in the classroom, which promotes more student-centered learning environments, may cause tensions between teachers and students. But as the globe increasingly moves to digital media and information, the importance of ICT is growing (Oliver, 2014). ICT is a tool that is used to make education more convenient for teachers and relevant for students, as well as to make information and knowledge more accessible to the public, which supports the idea of inclusivity. The use of ICT in education would revolutionize the country's educational processes by providing the required platforms for effective communication (Bhutan MoE, 2014).

Effectiveness of teachers is greatly impacted by their knowledge of how to use these tools in the teaching and learning process. Teachers' views have an impact on how they use these tools. As their ICT experience grows, their attitudes also improve, which is an important finding because it shows that ongoing teacher training is a crucial component in the efficient use of ICT in the teaching and learning process. Those with less experience had higher levels of knowledge and more positive attitudes. By enabling students to engage in active, self-directed, and beneficial information inquiry, ICT use transforms the learning and teaching process and produces a powerful learning environment (Singh, 2014). Numerous businesses' daily operations have been shown to be impacted by ICT (UNESCO, 2015). Among the qualities required for the 21st century, ICT abilities were discovered to be crucial. The use of ICT technology in education has improved teaching and learning at all levels and across all subject areas (Vandeyar, 2015). One of the key goals of improving

Rwanda's poor centralized education system was the incorporation of ICT policies at all levels of education (Kayisire & Wei, 2016).

In order to fully utilize the educational potential of digital resources, Internet communications, and interactive multimedia to pique students' curiosity and promote learning, many teachers, according to Bas, Kubiatko, and Sunbuul (2016), believe that interesting and carefully planned tasks, projects, and resources are essential. To teach students the knowledge and skills they will need in the twenty-first century, ICT is being used in educational institutions more frequently. In order to overcome the gap between the impact of ICT on business and daily life, educational institutions are aiming to improve their educational curricula and classroom equipment. ICT is now seen as being a crucial tool to support innovative methods of teaching and learning processes rather than just an addition to conventional teaching practices. In many educational institutions around the world, ICT is being incorporated into the teaching-learning process. The preparation of teachers is essential for the successful integration of ICT into the teaching-learning process. The usage of ICT in the classroom is crucial for providing students with learning possibilities. ICT still has a significant impact on how knowledge is transmitted and retained.

Hamilton, Rosenberg, and Akcaoglu (2016), a group of researchers, agree with this conclusion teaching with digital technologies has altered education in general, and elementary school, in numerous ways. Digital technology can help to encourage innovative teaching styles that contribute to the successful acquisition of knowledge and skills, particularly those that are required in today's environment. Digital technology can help support and improve both onsite and online teaching and learning. Teachers used computers to create lesson plans, create supplementary instructional materials, refresh their subject knowledge and teaching techniques, distribute relevant information over the internet, and create question banks. They prepared exam papers, simulations, games, and student assignments using computers, among other things. They also utilized them to present something in class, display student work on the school website, and produce exam papers (Bhalla, 2013).

ICT is increasingly being used in schools, Educators and policymakers believe it is now a requirement in basic education for pupils to succeed in the twenty-first century. ICT has evolved in recent years to include applications such as information, location, construction, and communication, among others. Furthermore, software, hardware, and connection have advanced to the point where more ICT can be integrated into topic content and children's collaborative work, better matching the ways in which most primary teachers educate (Lim, 2013). The likelihood of excellent ICT integration in the teaching-learning process in the field of education increased with each criterion. The results show that ICT can be utilized for a variety of purposes, including the delivery of instructional materials, general administration, diagnostic testing, timetabling, library services, and sharing academic records with parents (Eyiuche, 2014). ICT-enabled effective teaching and learning environments allow for better cooperation among educators and learners, as well as a more personalized and active learning experience for students, with the explicit goal of leading students towards desired learning outcomes. (Ministry of Education, Bhutan, 2014).

According to Johnson, Riel, and Germain (2016), technology has become a daily requirement to exchange knowledge and information in the field of 21st-century education all over the world, and when technology is used in classroom teaching settings, it helps to increase teacher knowledge and support students to improve learning and motivation for better performance. In the twenty-first century, technology is influencing the method and outcome of education. In schools, digital technology and information developments have become ingrained in the teaching and learning process. Digital learning innovations that empower teachers and students to study autonomously include e-learning, virtual courses, game-based learning, interactive multimedia, and computer-based learning. ICT infrastructure must be integrated throughout the entire educational system. ICT-based educational procedures are instructional approaches that actively employ ICT resources to enhance student learning (Agbo-Egwu et al., 2018).

Humanity is presently living in the information age, sometimes known as the computer age. This epoch is distinct from the Stone Age and Neolithic periods.

Computers and related technologies have become an integral part of daily life as the world we live in continues to change. It has engulfed our world more than any other technological advancement in the last century. Computers currently handle and analyze all types of data and information in business, education, government, and research, in addition to performing complicated, repetitive, and difficult jobs. Information now drives the economy and sociopolitical structures, thanks to technological advancements.

2.5.1 Teacher Readiness Towards The Use Of ICT In Teaching

ICT has reportedly had a significant role in the global revolution in education, according to Khokhar and Javaid (2016). Pakistan has greatly increased its use of ICT during the past ten years. The most current educational strategy of the Pakistani government places a strong emphasis on ICT usage in the classroom. The curriculum resources urge teachers to use ICT into their lesson plans and student activities. The study is restricted to Pakistan's four largest cities and focuses on ICT use in Pakistani schools. The study examines how teachers and students use ICT in daily life. The study explores students' perceptions of teachers' use of ICT for teaching, learning, and evaluation in the classroom. According to the poll, both students and teachers have access to computers in their classrooms and at home, and they use them for a range of activities, including communication, education, and enjoyment. The study also identifies differences in how and when technology should be used in the classroom between teachers and pupils. The study reveals two competing points of view. Students don't agree with their teacher's assessment of the use of ICT in the classroom, despite the fact that teachers think they are utilizing it effectively. In this study, the adoption of ICT for learning and teaching in Australian and Saudi Arabian elementary schools is compared for similarities and differences. (Jafar, 2017).

2.5.2 Challenges Faced By Teachers While Implementing ICT In Teaching

Due to their lack of technological proficiency, teachers found it challenging to fully integrate ICT into their teaching techniques, albeit the transitional phase assisted them in improving their digital literacy. Lack of ICT infrastructure, internet access, electricity, technological know-how, and teacher preparation in educational institutions are just a few of the problems that make it difficult for developing nations like Pakistan to successfully implement ICT in the classroom (Abbasi et al., 2021). Effective technology integration depends on the viewpoints and attitudes of the teachers in addition to the technology-related variables already discussed. In order to use technology effectively in their instructional practices, educators must allow their values to guide their pedagogical judgments in order to meet the demands of twenty-first-century teaching and learning (Tondeur et al., 2017). Dong (2018), explains that, considering the prevalence of ICT in today's environment, preschool teachers are expected to include ICT into their curricula and pedagogical practices. In order to learn about the adjustments and difficulties four preschool instructors are experiencing as a result of using ICT, a study was conducted, which is described in this paper. Teachers generally agreed that providing young children with access to ICT had improved their awareness of the outside world.

However, this had put the teachers' pedagogical skills and professional expertise to the test. Additionally, due to a lack of efficient ICT training and professional development, the teachers encountered considerable difficulties integrating ICT into their classes. Given the growing importance of incorporating ICT into early childhood education, it is essential to develop specialized ICT policies and curriculum that will help teachers become more proficient in using ICT and make the most of its potential. Lack of managerial oversight on the implementation of the ICT plan, difficulty and complexity of work, teachers' lack of cooperation with one another regarding ICT management, the lack of relevance and appropriateness of lesson content, and managing and controlling class spending on ICT equipment are all organizational problems. Lack of computer and internet equipment, heavy workload

when utilizing ICT, and insufficient instructor incentive to use ICT. ICT for teaching and learning is now required for high-quality education. ICT tools include things like computers, the Internet, software, and a range of devices.

Ramasamy, Anthony, Ghavifekr, and Kunjappan (2015). This study's main objective is to investigate how teachers perceive the challenges they face when using ICT in the classroom. Using a quantitative study design, the information was gathered at random from a sample of 100 secondary school teachers in the Malaysian state of Melaka. A modified and adopted survey questionnaire was distributed in order to obtain evidence. Overall, the following issues and difficulties were shown to have a major impact on teachers' use of ICT tools: poor network connection and accessibility, limited technical support, inadequate training, time constraints, and teachers' competence. A separate study's results also show that male teachers (M = 2.08, SD =.997) use more ICT resources in the classroom than female teachers (M = 2.04, SD =.992), who use less of them. It is hoped that the study's findings would help those in charge of incorporating new technology into classroom learning and teaching by offering advice.

According to Gebremedhin and Fenta(2015), one of the most important considerations when using ICT in teaching and learning is the accessibility of materials. The findings demonstrated that although teachers at Adwa College are eager to use ICT resources, they face challenges such as limited access to ICT resources and a lack of training opportunities. Overall, teachers claimed that while they agreed with the benefits of ICT integration, they were unsure of how to implement it because of the Ministry of National Education's lack of support, the school administration's lack of cooperation, and the lack of in-service teacher training and expertise in ICT use (Bayram, 2016).

2.6 SUGGESTED SOLUTIONS TO OVERCOME THE CHALLENGES FACED BY THE TEACHERS TOWARDS THE USE ON ICT IN TEACHING

According to Akram et al. (2022), there are a number of obstacles that prevent effective technology integration in teaching-learning practices, including a lack of funding, leadership support, accessibility of ICT infrastructure, a lack of time, ambiguous policies, professional development, technical support, and a lack of suitable pedagogical models. In order to reap the rewards of technology-integrated teaching and learning, concerned authorities should focus on the needs and gaps that prevent educational practices from properly integrating technology.

Akram and Yang (2021), On the other hand, the absence of standardized educational guidelines has been recognized as a key barrier that prohibits educational practices from successfully integrating technology and makes it difficult to get over the barriers in the articles we studied. Therefore, in order to overcome these obstacles, relevant educational authorities must act quickly to create policies that include ICT into teaching methods that take into account the nation's present needs and academic settings at all levels. Teachers assert that they do not have the time to successfully use ICT to increase the efficacy of their instructional strategies, according to Akram et al. (2021). It is essential to assist teachers by providing professional development and time management programs, whether they are pre-service or in-service teachers, in order to overcome these possible barriers.

In a study on teachers' attitudes toward the use of ICT in secondary schools in Nigeria (2021), recommended pre-service and in-service training for all teachers on the integration of ICT, and the school administration should also work to provide these facilities through donor agencies and individuals. Choeda et al. (2016),study focused on the ICT-Integrated Pedagogy at the Colleges of the Royal University of Bhutan (RUB) The main issues include inadequate internet bandwidth, unreliable internet

service, and a lack of ICT pedagogy training. They concluded that addressing these barriers will boost teacher motivation at RUB even more.

2.7 RELATED LEARNING THEORIES

They assist teachers in recognizing and meeting the needs of their students, learning theories are crucial in education. Each teaching and learning theory explains teaching and learning in its own unique way and makes a connection between what is taught and the environment in which it occurs (Mugisha, Christopher, & Mugimu, 2014).

For teachers who wish to incorporate ICT in their teaching, a variety of learning theories serve as a solid foundation. However, for the sake of this study, the researcher will only suggest that the following three possibilities be investigated further:

2.7.1 The Theory of Cognitive Load

According to this view, the optimal conditions for teaching and learning are those that are connected with human cognitive design. A tiny quantity of new information may be processed by the human brain at one time. It can, however, store a significant quantity of data. Working memory capacity has been diminished, according to Sweller (1988), hence the teaching strategy must prevent overloading. Teachers must assist learners in keeping their cognitive load to a minimum during the teaching process if teaching is to be effective. Sweller (1988) proposes that Auditory and visual aids are used to boost working memory capacity. As a result, using ICT tools in teaching reduces the cognitive burden on people's hearing information by replacing it with visual information. The primary learners can benefit from this approach by receiving pertinent information in a more efficient manner, which will make learning meaningful. The young students choose lessons that use ICT to study relevant topic material to make learning interesting so that learning becomes a lifelong

ability, and teachers use professional ICT abilities. This is due to the fact that Bhutan's educational system is still in the ICT implementation stage.

2.7.2 Gardner's Theory:

According to Helena and Sreenidhi (2017), all intelligence is used at the same time, complementing one another as people learn to solve challenges. Learning from textbooks focuses solely on a linguistic approach, whereas integrating technology into the teaching and learning process incorporates multiple intelligences, including visual, spatial, linguistic, verbal, logical, and musical intelligence, allowing for more flexibility in meeting the needs of a wider range of learners. As a result, Gardner's Multiple Intelligence learning theories are closely related to technology teaching and learning. Students will therefore quickly pick up on ICT if teachers employ it in the classroom in the twenty-first century, and learning will become a lifelong process for them.

2.7.3 Constructivism Theory

The constructivist teaching and learning theory contributes significantly to the teaching and learning processes. Constructivism is a philosophy of learning that describes how humans learn. Piaget was one of the first to propose that when learners are actively participating in learning, learning occurs through the 'construction' of new information (Gould, 2012). The work of teachers, according to the constructivist perspective, is to act as facilitators rather than teachers. Any learning environment, on the other hand, should promote and challenge the learner's thinking. In any situation, using the proper technique at the right time to achieve a positive outcome is critical. As a result, the researcher believes that using technology will be the best treatment at the time. One of the many factors that cause teachers to perform below expectations could be related to teaching-learning techniques. Technology is therefore viewed as one of the ways to alter a teacher's mindset on the use of ICT to enhance teaching for achievement. Since ICT integration in education is a novel concept that is beginning to gain traction in Bhutan's educational system to make teaching and learning relevant

for students of the twenty-first century, this theory is therefore very appropriate to the Bhutanese context.

2.8 RELATED RESEARCH AND STUDIES

The attitudes and behaviors of teachers about the use of technology in the classroom have been the subject of numerous studies. As a result, this section provides an overview of related research that has been done by educators all over the world. The confidence, beliefs, and self-efficacy of teachers as well as the school culture were found to be related to their views on the usage of digital technology in primary schools. Studies show that while integrating technology in the classroom, elementary teachers first lacked confidence, but as they saw and worked with their colleagues over time, their self-efficacy perspectives improved (Wake & Whittingham, 2013). Technology was once perceived as a tool to help teachers provide a better lesson, but with time it evolved into a tool for students' academic advancement (Wake & Whittingham, 2013). Preservice teachers received more focused instruction, and as a result, their attitudes and behaviors about technology integration improved (Rehmat & Bailey, 2014). On the one hand, research on preservice teachers' self-efficacy beliefs may shed light on their confidence in integrating technology and allow for better preservice teacher training (Lemon & Garvis, 2016); on the other hand, efficient technology training may help teachers develop positive attitudes and perceptions toward technology (Apeanti, 2016). Rookie primary teachers encountered device conflict since they were still learning how to integrate technology into their teaching practice (Orlando & Attard, 2016), showing that they were not experts in doing so (Wake & Whittingham, 2013).

The potential benefits of digital technology for teaching and learning in schools have been carefully investigated in the academic literature, according to a study by Badiaa, Menesesa, Sigalesa, and Fabregues (2014). On the other hand, little is known about the elements that influence how teachers view these benefits. The study's main goal was to create and evaluate a model of the factors that influence primary and secondary school teachers' opinions of the benefits of using digital

technology in the classroom. The term "instructional advantages" refers to how digital technology has influenced the development of various curriculum components, including learning objectives, activities, and resources as well as the adoption of new evaluation methods.

A survey of 702 teachers from 356 primary and secondary schools in Spain provided the information for this study. The study's objective was to determine whether there was any correlation between teachers' opinions on the advantages of employing digital technology in the classroom and both personal and institutional factors. Using correlation analysis, it was determined whether general features and teachers' perceptions were related. There were a number of significant relationships found. According to preliminary study, characteristics like teaching environment, digital literacy, educational ICT training, and Internet access are predictive of teachers' perceptions of the educational benefits of digital technology. The results of the study will help educators and schools make better use of digital technology in teaching and learning.

Three fictional characters, Yaman, Koksal, and Saka, were used in a 2016 study to determine and evaluate Turkish pre-service science teachers' attitudes on technology in terms of their learning styles, computer proficiency, computer ownership, and gender. The survey was completed by 264 Turkish pre-service science teachers. The data were analyzed using a one-way ANOVA, four-way ANOVA, t-tests, Mann Whitney U test, and t-tests. The findings showed that there was one main impact for gender and one interaction effect between gender and computer competency level. Male pre-service science teachers with inadequate computer abilities showed more positive attitudes toward instructional technology than their female colleagues, according to the interaction effect. The results of a study by Timothy (2017) showed that teachers could explain the idea of taking risks using their own terms and vocabulary as well as strategies to encourage pupils to do so. From this angle, educators saw the use of ICT as a helpful tool for encouraging students to take risks in their creative design work. Additionally, ICT protected students from failure and unfavorable peer criticism while allowing them to take risks in ways that inspired

them. According to the research, creating a climate that encourages creative risk-taking required a certain level of competence, particularly in terms of student management, which was equivalent to teachers taking risks in their teaching practices.

Nydia (2018) looked into the knowledge, attitudes, and practices of teachers in relation to using technology in the classroom. All grades are required to use technology, according to standards specified by the Texas State Board of Education. The American Academy of Pediatrics (AAP) also recently modified its recommendations regarding kids' use of technology. The AAP's recommendations must also be followed by teachers when they apply and integrate these standards. There were statistically significant changes in attitudes between districts, but individual teacher characteristics had no statistically significant impact on knowledge and attitudes. There was a statistically significant difference between master's degree holders and non-holders, according to the regression analysis for practice.

Spiteri and Rundgren (2018). Despite the widespread usage of digital technology in classrooms, studies around the world have shown that it has little impact on students' academic achievement. In their daily practices, teachers must be aware of and make use of digital technology's potential. On the other side, teachers need instruction and guidance to increase their understanding of how to use technology in teaching and learning. Students might not acquire the necessary coping skills for their future lives in the information era if this is not done. In order to improve training recommendations and promote a more directed and appropriate use of technology in education, the purpose of this literature review was to identify the elements that affect primary teachers' use of digital technology in their teaching practices.

Applying the concept map to the data from the chosen studies revealed four contributing factors, including the influence of school culture on teachers' knowledge, attitudes, and skills. These conclusions sparked ideas for additional research as well as suggestions for teacher technology training. Perry (2018) A one is to one laptop environment is being used for technology integration in a school district in Western Pennsylvania. The effect of technology integration in the classroom on student

achievement has been the subject of a lot of writing. The majority of study on education centers on the accessibility of technology and how it is used in the classroom. The goal of this study is to examine how technology is applied to teaching in the classroom. Teachers' perceptions of their own teaching methods were gathered using the Technological Pedagogical Content Knowledge (TPACK) Framework, and they were contrasted to classroom observation methods gathered by building administrators throughout the academic year. If teachers' opinions of TPACK are associated with the use of instructional technology, as determined by Substitution, Augmentation, Modification, and Redefinition (SAMR) and the Charlotte scale.

Mohammed employed the research (2016), This study examines the perspectives and uses of educational technology in the classrooms of administrators and Arabic language teachers. The study is conducted in Saudi Arabia, a country where ICT use in schools is still in its infancy. ICT hasn't been widely used in education, according to earlier studies. The premise of this thesis is that the lack of pedagogical technology use is to blame for these limitations. To successfully integrate ICT, it is essential to comprehend the pedagogical justifications and in-depth responses of principals and teachers. The ICT attitudes and practices of teachers are examined in this study. The purpose of this study is to identify the connections between teachers' technological beliefs and actions in the classroom, as well as the variables affecting these connections. The research also looks into how teachers use ICT and how school principals feel about technology. In addition to confirming or identifying other elements that affect teachers' technological practices, the research aims to examine the relationship between principals' attitudes and teachers' beliefs and practices about ICT. The researcher thinks that direct evidence of practice beyond self-reported practice is essential for converting research into school reality because of the numerous studies that measure teachers' self-reported attitudes and practices and the fact that teachers' practices do not always reflect their beliefs. Additionally, this study's topic requires in-depth comprehension and investigation due to its nature.

Rahmi, Fachraini, and Fitriati (2019), Teachers and educators can now more easily accomplish their teaching and learning goals thanks to technological

improvements. As technology improved in the classroom, teachers were expected to use it to enhance the quality of their teaching using tools like ICT-based media. The survey of 73 primary school teachers' attitudes and opinions towards the use of ICT-based media, particularly video, in the teaching-learning process served as the basis for this paper. Both quantitative and qualitative data were used to demonstrate teachers' perceptions. The results of this study show that almost all teachers think using media in the classroom is very important. The majority of teachers, or 95%, agreed that using ICT-based media made teaching and learning more enjoyable and efficient. The partnership between teachers and the media, they believed, enables students to quickly understand and memorize concepts, making the role of the media in combination with the teacher crucial in the classroom. Teachers, on the other hand, not only reacted favorably to ICT-based media, but they also encountered some difficulties when implementing it in the classroom. For example, teachers did not have the necessary knowledge or fundamental concepts about ICT, believed they were old enough to use ICT in the future, did not have good eyesight, found it inconvenient to use ICT in the classroom, and did not have access to ICT facilities at the school. This recommends that in order to promote the use of technology in their classrooms, teachers should take part in a professional development program.

Every aspect of life, including schooling, has been affected by technology improvements, claims Caroline (2020). Therefore, the aim of this study is to identify the barriers to technology use in Indonesian language teaching and learning. The methodology for this study was quantitative. 30 teachers from rural Bandung were chosen at random to participate in the study. Data were gathered through questionnaires and evaluated using a mixed-method strategy that used quantitative and qualitative methodologies. The results showed that using technology in the classroom was advantageous. Schools are also increasingly supplying pupils with tools and resources to help them advance their technological literacy. Despite the fact that the school has enough facilities. The use of technology in language-learning classes was not without its challenges. Policymakers can use the additional data from this study to learn more about how to employ ICT for teaching and learning in the classroom.

Excellent findings were obtained from each of the aforementioned studies. The use of ICT in education to enhance teachers' ICT skills has been found to be successful in research carried out by numerous academics throughout the world. The studies did, however, also point out some restrictions and recommendations for future researchers to concentrate on some particular development areas. They also promoted making the best use of ICT in education possible by using the study's results to inform conclusions. The use of ICT in the classroom may also present practical challenges for Bhutanese teachers. As a result, the researcher in this study attempted to compare and examine primary Bhutanese teachers' perceptions and practices toward the use of technology in teaching in 13 primary schools in Tsirang District, Bhutan. Additionally, school administrators and policymakers may alter teachers' ICT skill sets as needed to make teaching and learning a continuous process for improved student accomplishment and to build human capacity of Bhutan on a larger scale.

CHAPTER 3

RESEARCH METHODOLOGY

The study's overall methodology which includes the population, research design, research tools, validity and reliability, data collecting, data analysis, and ethical consideration is described in this chapter.

3.1 RESEARCH DESIGN

In 13 primary schools in Tsirang District, the researcher used Survey Research Methodology (SRM) to investigate how primary Bhutanese teachers perceive and use technology in the classroom. SRM is a strategy that integrates quantitative and qualitative research approaches in a single study, according to Venkatesh, Brown, and Bala (2013). According to Guest and Namey (2015), a single study combined the processes for acquiring and analyzing both quantitative and qualitative data.SRM is described as a study that gathers, analyzes, and interprets quantitative and qualitative data in one or more studies that look at the same underlying phenomenon by Bentahar and Cameron (2015). Quantitative research deals with numbers and statistics, whereas qualitative research concentrates on words and meanings. In-depth examination of concepts and experiences is made possible by the use of qualitative approaches. The SRM technique integrates qualitative and quantitative data in a single study project (Halcomb & Hickman, 2015).

Almalki (2016), defines SRM as a type of study in which researchers combine elements of qualitative and quantitative research approaches to gather comprehensive data. SRM is an approach of inquiry that combines both qualitative and quantitative approaches, according to Creswell and Clark (2007). It necessitates the application of philosophical presumptions, qualitative and quantitative research methods, and their

integration. SRM combines components of qualitative and quantitative research methods for the purposes of substantiation, depth, and breadth of knowledge (Johnson, Onwuegbuzie, & Turner, 2007).

The purpose of this study was to learn how primary teachers in Bhutan view and use technology in the classroom. In this study, 115 primary teachers from the Tsirang district were evaluated. The quantitative results were obtained through online survey questionnaires, while the qualitative results were obtained through online semi-structured interviews. A diagram of the research process is shown in Figure 3.1.

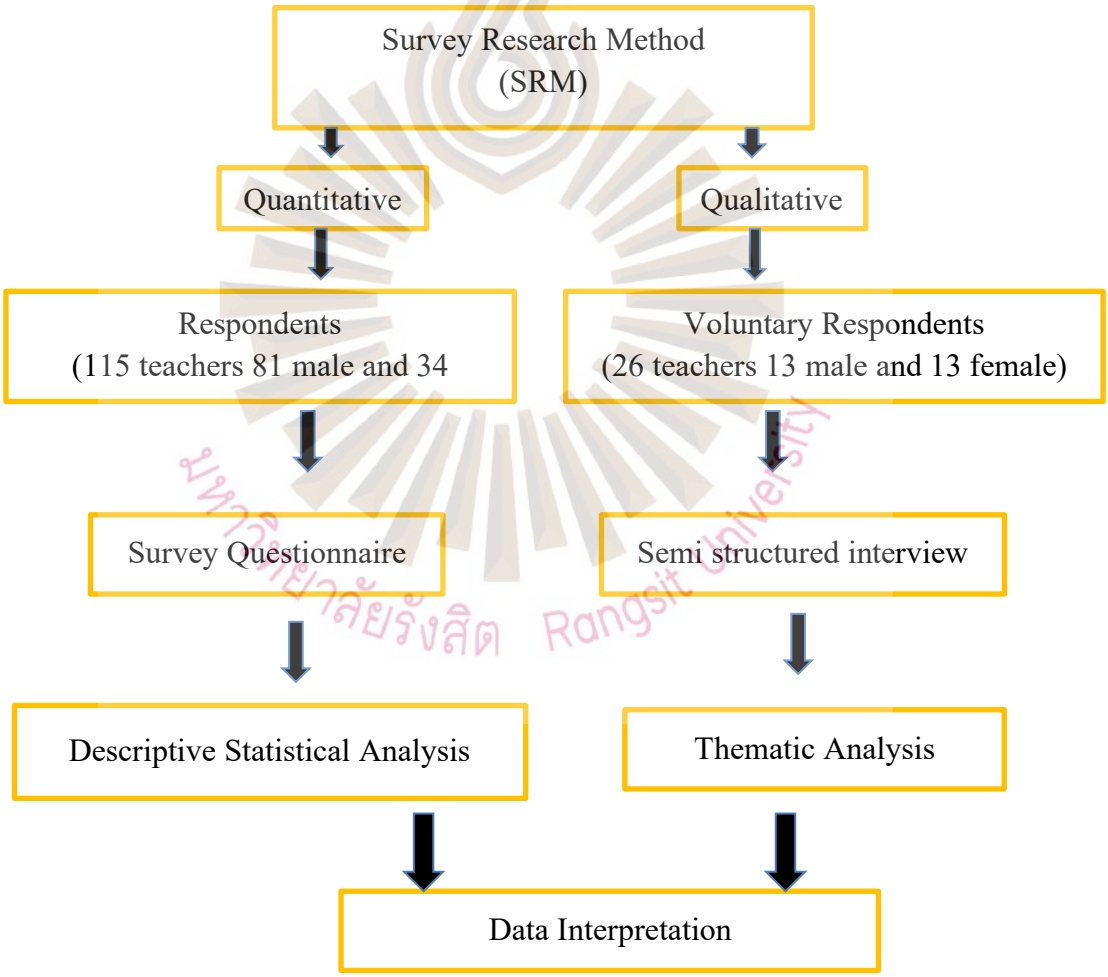


Figure 3.1 Research Design.

Source: Adapted from Denkar & Chalermirundon, 2020

3.2 LOCATION OF THE STUDY

Thirteen primary schools in the southern region of Bhutan's Tsirang district were the subject of the study, which was conducted for primary teachers.

3.3 RESPONDENTS

Hundred and fifteen primary school teachers from 13 primary schools in Tsirang district made up the study's total sample of respondents. The range of teaching experience was between 1 and 31 years and beyond.

Table 3.1 Demographic Profile of the Research Respondents (n=11)

<table>
<tr><th>Gender</th><th>School Location</th><th>Experiences as a Teacher</th><th>Professional qualification</th></tr>
<tr><td rowspan="5">Male: 81

Female:34</td><td rowspan="2">Rural
Male: 54
Female:14</td><td>1-10 years
Male:30
Female:24</td><td>PTC
Male:6
Female:3</td></tr>
<tr><td>11- 20 years
Male:34
Female:5</td><td>ZTC
Male:0
Female:0</td></tr>
<tr><td rowspan="2">Urban
Male: 0
Female:0</td><td>21-30
Male:9
Female:3</td><td>B.Ed
Male:59
Female:20</td></tr>
<tr><td rowspan="2">31 and above
Male:8
Female:2</td><td>MA/M.Ed
Male:9
Female:3</td></tr>
<tr><td>Semi Urban
Male: 27
Female:20</td><td>Other
Male:17
Female:8</td></tr>
</table>

3.4 RESEARCH INSTRUMENTS

The researcher employed a survey research approach for this investigation. Teachers who volunteered to participate in the survey and semi-structured open-ended question interviews were used to get the data.

3.4.1 Quantitative method

To investigate perceptions and practices towards the use of technology in teaching for the study, the researcher employed 23 questions to gather quantitative data. Four additional categories were added to it. The teachers were asked nine questions about their awareness of ICT, three questions about their ICT ability, six questions about their readiness for using ICT in the classroom, and five questions about the challenges they encountered. Using their email accounts, the respondents filled out the survey form independently in July and August of 2022. Every item was given a Likert score between 1 and 5 on a scale of 5.

Table 3.2 Range explanation for the Likert scale with mean scale

Level of opinion	Scores	Scale for means	Description
Strongly agree (SA)	5	4.21 - 5.00	Highest
Agree(A)	4	3.41 - 4.20	High
Neutral (N)	3	2.61 - 3.40	Moderate
Disagree (D)	2	1.81 - 2.60	Low
Strongly Disagree (SD)	1	1.00 - 1.80	Lowest

Source: Adapted from Chanjaraspong, 2017

3.4.2 Qualitative method

In order to investigate more about primary Bhutanese teachers' perceptions and practices towards the use of technology in teaching and to gather qualitative data for the study the semi-structured qualitative questions were prepared based on the findings of the survey questionnaires. Twenty- six volunteer teachers from 13 primary school, were asked to respond. Two teachers were selected from each school to participate in an online semi-structured interview preferably (one male and one female). The respondents were selected with the help of the school administrator.

3.5 VALIDITY AND RELIABILITY OF THE RESEARCH INSTRUMENTS

3.5.1 Validity

By carefully examining the topic coverage and relevance, the linguistic accuracy and suitability, feedback, and requests for recommendations from three experts, the validity of the questions was ensured (IOC). Turner and Carlson validated all of the instruments using the IOC (2003). Experts evaluated the material's validity using analytical criteria, and each component of the research tools was ranked on a scale:

IOC is calculated using the formula IOC =∑ = where 'r ' is the average rating of each expert and 'n' is the total number of experts. Additionally, a score of one means that the item clearly reflects the study's objectives and that the measurements are consistent with those goals. A score of 0 means that the measures are unsure or uncertain about whether they satisfy the goals, and a score of -1 means that the item does not match the study's objectives or that the measure does not accurately reflect any given goal. A score between 0.67 and 1.00 will be accepted and considered correct. The permissible range was met by all 23 items. The questionnaire and semi-structured open-ended question interviews both received a validity score of 1, respectively. (For IOC of the questionnaire and the semi-structured open-ended question interviews, see Appendices D and E.)

3.5.2 Reliability

The test was administered to 30 teachers from other districts using online questionnaires to assess item reliability. It was also validated by three specialists, including one from Rangsit University and two from Bhutan with Master's degrees in education. In order to calculate the dependability coefficient, Cronbha alpha was used. According to the Cronbach's Alpha scale, which is illustrated below, a score of 0.70 or higher was typically regarded as acceptable:

Table 3.3 Cronbach's Alpha Rating Scale

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Source: as cited in Mohamad, Sulaiman, Sern, & Sahheh, 2015

The whole questionnaire's Cronbach's Alpha ($\propto$) score of 0.07 clearly showed that the instruments were reliable for the study (Refer to Appendix G for the survey questionnaire reliability test result).

3.6 DATA COLLECTION PROCEDURES

The following methods were employed to gather the required information:

1) Thirteen primary school principals in the Tsirang district, the Rangsit University Thailand, Ministry of Education Bhutan and the Chief District Education office Tsirang, all provided letters of authorization for the research to proceed.

2) With the assistance of the school principals, all of the teachers in the schools were informed by emails and phone calls.

3) In the month of July 2022, the researcher sent the questionnaires to each responder through email and carried out an online survey to collect the quantitative data.

4) Twenty-six teachers were questioned online for the qualitative data, and the respondent was scheduled for an online interview in July (2022).

3.7 DATA ANALYSIS

The information was acquired and examined in accordance with two distinct study objectives. Quantitative information was gathered through the survey questionnaire in order to investigate teachers' perceptions of using ICT in teaching and learn more about their practices. To better understand how teachers perceive and use ICT in their lessons, semi-structured online open-ended question interviews were conducted to collect qualitative data.

3.7.1 Survey Questionnaire

The primary goal of qualitative data analysis, according to Lochmiller and Lester (2017), is to provide the collected data some kind of organization and context. The

researcher employed a survey questionnaire comprising 23 items in order to evaluate the perceptions and practices of primary Bhutanese teachers towards the use of ICT in teaching, the researcher employed a survey questionnaire comprising 23 items. It was further divided into four sections, including nine questions on awareness and three questions on skills to assess teachers' ICT ability. In the section on ICT practices, the researcher asked 6 questions on teachers' readiness and 5 questions about the challenges they encountered while integrating ICT into their regular lessons.Utilizing a computer software, the quantitative information gathered from the questionnaires was examined. By calculating the total score, mean score, and standard deviation, the respondents' demographic data, perceptions, and practice level were examined.

3.7.2 Semi-structured Interview

Twenty-six volunteer teachers from 13 primary schools participated in an online open-ended questions semi-structured interview to learn more about how primary Bhutanese teachers feel and use technology in the classroom. Thematic analysis was used to examine and understand the semi-structured interview data. To increase the study's quality, the following method was used to choose the respondents.

The researcher included two volunteer representatives from each school, one male and one female, to achieve a fair response from the respondent. Followed one of the following criteria to select the respondents. A respondent with a high caliber of ICT skill, a respondent with a low caliber of ICT skill, a respondent having limited ICT resources, a respondent having adequate ICT resources, a respondent that had rated high in the survey questionnaires, a respondent that had rated low in the survey questionnaires, and respondent that has high experiences as a teacher in that particular school.

3.7.3 Ethical Consideration

To launch the research under Tsirang District, the researcher applied for approval from Rangsit University, the Ministry of Education Bhutan, the Chief

Education Officer, Tsirang District and 13 primary school principals of Tsirang District.

3.7.4 Confidentiality

The personal information of respondents, questionnaire papers, and semi-structured interview records of the sample group were kept topmost confidential by the researcher.

CHAPTER 4

RESULT AND DATA ANYALYSIS

The Study of Primary Bhutanese Teachers' Perceptions and Practices Towards the Use of Technology in Teaching is covered in this chapter. It contains a study of the information gathered through the use of survey questions and online semi-structured written interviews as research instruments. A quantitative approach was used to collect the survey responses from 115 teachers, and the resulting data were computed and analyzed. Semi-structured online written interviews with 26 willing teachers were conducted and the outcomes were then qualitatively reviewed. Tables are provided to help visualize the results.

4.1 ANALYSIS OF THE QUANTITATIVE DATA

The quantitative data presented in this section responds to the following two research questions: What would be the primary Bhutanese teachers' perceptions of the use of technology in teaching? and What would be the primary Bhutanese teachers' practices towards the use of technology in teaching be like?

Based on each teacher's perceptions and practices, survey results were supplied about teacher awareness of ICT, teacher ability on ICT, teacher readiness towards the use of ICT in teaching, and challenges when utilizing ICT in teaching. In the descriptive statistics analysis of the outcomes, means and standard deviation were used. The mean score for the 23 items, which varied from 4.21 to 5.00, was regarded as the highest score, and was followed by scores of 3.41-4.20, 2.61-3.40, 1.81-2.60, and 1.00-1.80.

Table 4.1 The survey questionaries

Sl. No	Statement	$\bar{X}$	SD	Level of Agreement
Teacher Awareness of ICT				
1	My teaching demands use of ICT.	4.40	0.76	High
2	Students can participate more actively and be more involved in the lesson when ICT is used in the teaching.	4.50	0.73	Highest
3	Some of the greatest social media platforms for teaching and learning include Google Classroom, Facebook, Messenger, Telegram, WeChat, WhatsApp, Zoom, and Voov.	4.30	0.68	High
4	In my opinion, ICT use helps to produce teaching resources and raises the standard of teaching.	4.40	0.59	High
5	I think my ICT proficiency impact teaching.	4.10	0.81	High
6	My school has a policy for upgrading ICT skills.	3.60	0.91	High
7	My school provide timely ICT training to skill up my ICT knowledge.	3.40	1.00	Moderate
8	I would prefer chalk and chalkboard over ICT tools.	2.44	0.90	Low
9	When teachers encounter problems with ICT, school administrator offers technical assistance.	3.70	0.91	High
Teacher Ability on ICT				
10	I can design lesson plans for efficient teaching using a desktop or laptop with confidence.	4.50	0.73	Highest
11	I am comfortable incorporating ICT into my regular teaching.	4.30	0.69	High
12	I am comfortable to use all kinds of ICT equipment's that are available at the school.	3.98	0.90	High

Table 4.1 The survey questionaries (Cont.)

Sl. No	Statement	$\bar{X}$	SD	Level of Agreement
Teacher Readiness towards the use on ICT in teaching				
13	I have a projector or television screen in my classroom that can be used for teaching.	3.50	1.50	High
14	My lessons are significantly more effective when I include video in my teaching.	4.30	0.71	High
15	When I incorporate audio into my teaching, they are substantially more effective.	4.00	0.70	High
16	When I use PPT my lessons become much more effective.	4.10	0.71	High
17	The internet at my school is consistently reliable.	3.30	1.10	Moderate
18	My school has a computer lab or room that is completely functional, and always available for teaching and learning purposes.	3.90	0.94	High
Challenges while using ICT in teaching				
19	I don't have enough teaching time to use ICT.	2.70	1.00	Moderate
20	My use of ICT is discouraged by the school administration's lack of support.	1.60	0.84	Low
21	Due to the poor internet connection prevents me from adopting ICT tools in teaching.	2.90	1.10	Moderate
22	Fixing ICT equipment in the middle of a lesson takes time and lowers the quality of my teaching.	3.40	1.00	Moderate
23	My difficulty to use ICT in teaching is due to electricity fluctuations.	2.40	1.04	Low
Average		3.7	1.1	High

According to data gathered and analyzed from the study's respondent survey questionnaire. Table 4.1 shows the mean and standard deviation of each questionnaire

statement as well as the degree of agreement. According to the level of opinion, the average mean was 3.7 and the standard deviation was 1.1, as shown in Table 4.1 above. The range of the overall mean scores was 1.60 to 4.50. The questionnaire contained 23 items, of which 2 (Item No. 2 and 10) were scored as Strongly Agree, 13 (Item Nos. 1, 3, 4, 5,6, 9, 11, 12, 13, 14, 16 and 18) were scored as Agree, 5 (Item Nos. 7, 17, 19, 21 and 22) were scored as Neutral, and 3 (Item Nos. 8, 20, and 23) were scored as Disagree. The statements No. 2 and No. 10, "Students can participate more actively and be more involved in the lesson when ICT is used in the teaching," and "I can design lesson plans for efficient teaching using a desktop or laptop with confidence," received the highest mean scores, with mean scores of 4.50 for each. Statement No. 20 with a mean score of 1.60, "My usage of ICT is discouraged by the school administration's lack of support," had the lowest mean score.

4.1.1 Teachers' Perceptions Towards the Use of ICT in Teaching

Table 4.2 Teacher Awareness of ICT: Mean and standard deviation

Teacher Awareness of ICT	$\bar{X}$	SD	Extend of Agreement
1. My teaching demands use of ICT.	4.40	0.76	High
2. Students can participate more actively and be more involved in the lesson when ICT is used in the teaching.	4.50	0.73	Highest
3. Some of the greatest social media platforms for teaching and learning include Google Classroom, Facebook, Messenger, Telegram, WeChat, WhatsApp, Zoom, and Voov.	4.30	0.68	High
4. In my opinion, ICT use helps to produce teaching resources and raises the standard of teaching.	4.40	0.59	High

Table 4.2 Teacher Awareness of : ICT Mean and standard deviation (Cont.)

5. I think my ICT proficiency impact teaching.	4.10	0.81	High
6. My school has a policy for upgrading ICT skills.	3.60	0.91	High
7. My school provide timely ICT training to skill up my ICT knowledge.	3.40	1.00	Moderate
8. I would prefer chalk and chalkboard over ICT tools.	2.44	0.90	Low
9. When teachers encounter problems with ICT, school administrator offers technical assistance.	3.70	0.91	High
Average	3.9	0.81	High

Table 4.2 shows the mean scores and standard deviations for the teachers' assessments about the use of ICT in teaching and their awareness of ICT. The high level average score for this category was 3.9. With a mean score of 4.06 at the highest state, Item 2, Students can participate more actively and be more immersed in the lesson when ICT is employed in the teaching, was at the highest level. With a mean score of 2.44 at the low state, item 8, "I would choose chalk and a chalkboard over ICT equipment," had very little weight.

Table 4.3 Teacher Ability on ICT: Mean and standard deviation

Teacher Ability on ICT	$\bar{X}$	SD	Extend of Agreement
10. I can design lesson plans for efficient teaching using a desktop or laptop with confidence.	4.50	0.73	Highest
11. I am comfortable incorporating ICT into my regular teaching.	4.30	0.69	Highest

Table 4.3 Teacher Ability on ICT**:** Mean and standard deviation (Cont.)

Teacher Ability on ICT	$\bar{X}$	SD	Extend of Agreement
12. I am comfortable to use all kinds of ICT equipment's that are available at the school.	3.98	0.90	High
Average	4.3	0.77	Highest

The averages and standard deviations of ICT teacher abilities are shown in Table 4.3. The entire mean score was 4.3, which indicated having the most experience possible. I can confidently construct lesson plans for effective teaching utilizing a desktop or laptop, which had the highest mean score of 4.5 at the highest level. I am comfortable bringing ICT into my usual teaching was the item with the lowest mean score at the high level, 3.38.

4.1.2 Teachers' Practices Toward the Use of ICT in Teaching

Table 4.4 Teacher Readiness towards the use on ICT in teaching: Mean and standard deviation

Teacher Readiness towards the use on ICT in teaching	$\bar{X}$	SD	Extend of Agreement
13. I have a projector or television screen in my classroom that can be used for teaching.	3.50	1.50	High
14. My lessons are significantly more effective when I include video in my teaching.	4.30	0.71	High
15. When I incorporate audio into my teaching, they are substantially more effective.	4.00	0.70	High
16. When I use PPT my lessons become much more effective.	4.10	0.71	High
17. The internet at my school is consistently reliable.	3.30	1.10	Moderate

Table 4.4 Teacher Readiness towards the use on ICT in teaching: Mean and standard deviation (Cont.)

Teacher Readiness towards the use on ICT in teaching	$\bar{X}$	SD	Extend of Agreement
18. My school has a computer lab or room that is completely functional, and always available for teaching and learning purposes.	3.90	0.94	High
Average	3.85	0.94	High

The overall mean score for teacher readiness for the use of ICT in teaching was 3.85 at the high level, according to Table 4.4's means and standard deviation. The item with the highest mean score—item 14—was 4.3. With a mean score of 3.3 at the moderate level, statement number 17, "The internet at my school is consistently reliable," was the least rehearsed item.

Table 4.5 Challenges while using ICT in teaching: Mean and standard deviation

Challenges while using ICT in teaching	$\bar{X}$	SD	Extend of Agreement
19. I don't have enough teaching time to use ICT.	2.70	1.00	Moderate
20. My use of ICT is discouraged by the school administration's lack of support.	1.60	0.84	Lowest
21. Due to the poor internet connection prevents me from adopting ICT tools in teaching.	2.90	1.10	Moderate
22. Fixing ICT equipment in the middle of a lesson takes time and lowers the quality of my teaching.	3.40	1.00	Moderate
23. My difficulty to use ICT in teaching is due to electricity fluctuations.	2.40	1.04	Low
Average	2.6	1.0	Moderate

In Table 4.5, the averages and standard deviations of the items linked to challenges when using ICT in teaching are shown. With a mean score of 2.6, this

category's overall mean score fell into the moderate range. When teachers run into issues with ICT, it was guaranteed by the item with the highest mean score of 3.4 at the high level. The school administration's lack of support for my usage of ICT caused the lowest mean score, at 1.6, at a low level.

4.1.3 Summary of the Study of Primary Bhutanese Teachers' Perceptions and Practices Towards the Use of Technology in Teaching.

Table 4.6 Summary of The Study

Sl. No	Opinion Category	$\bar{X}$	SD	Extend of Agreement
1	Teacher awareness on ICT.	3.9	0.81	High
2	Teacher ability on ICT.	4.3	0.8	Highest
3	Teacher readiness towards the use on ICT in teaching.	3.9	0.94	High
4	Challenges while using ICT in teaching.	2.6	1.8	Moderate
Average		3.7	1.1	High

According to Table 4.6, the primary Bhutanese teachers' perceptions and practices on the use of technology in the teaching received an overall mean score of 3.7 at the High level. The mean score for teacher readiness for using ICT in the classroom was the highest, coming in at 4.3 on the scale of 1–5. The average challenge rating for using ICT in education is 2.6, which is considered to be moderate. The results show that primary teachers in Bhutan are having difficulty incorporating ICT into their normal lessons.

4.2 ANALYSIS OF THE QUALITATIVE DATA

The qualitative data required to study how primary Bhutanese teachers perceive and use technology in their teaching was collected using the semi-structured online open-ended questions interview approach. 26 volunteers participated in an interview at the conclusion of the study. They were teachers at 13 primary schools in the Tsirang District with a range of teaching experiences, teaching in both rural and semi-urban schools. The following criteria was implemented to select the respondent; the respondent with a high caliber of ICT skill, respondent with the low caliber of ICT skill, respondent having limited ICT resources, respondent having adequate ICT resources, a respondent that rated high in the survey questionnaires, a respondent that rated low in the survey questionnaires, and respondent that had high experiences as a teacher in that particular school. 13 male and 13 female responders, 1 male and 1 female from each school to represent their school. The respondents were identified as respondent1(R1), respondent 2 (R2), and so on to preserve their privacy. The respondent had the option of responding in English or Dzongkha, whatever was more suitable for them. Thematic analysis was utilized to examine the qualitative information from the respondent gathered from six questions in a semi-structured online written interview based on three broad clusters: Part I Teachers' attitudes toward the use of ICT in teaching, Part II Types on ICT tools that teachers use while teaching, and Part III Challenges teachers to face while implementing ICT in teaching. The responses of the respondents were translated from the results of the English data analysis. Table 4.7 shows detailed information about the respondents: (Refer to Appendix B)

4.2.1 Teachers attitudes towards the use of ICT in teaching

Positive attitudes towards the use of technology in teaching were discovered through a cumulative analysis of respondents' open-ended online interviews. The majority of respondents stated that they thought it was essential to include ICT in teaching because teaching and learning in the twenty-first century required technology to be efficient and simple. One of the respondents stated, "In the technology age,

everything moves quickly, and the strongest person is the one who has the most information. Therefore, it was considered extremely important to integrate ICT into teaching in order to complete tasks more quickly and easily". Furthermore, they stated that they believed that integrating ICT into education was essential since today's youth are true digital natives. Technology plays a critical role in improving the quality of teaching and making it simpler for students to comprehend. ICT in education is therefore very significant. Additionally, some respondents stated that incorporating ICT into their everyday teaching was essential because students are learning with pleasure in this digital age.

4.2.2 Types of ICT tools that teachers use while teaching

Most respondents admitted that they used a laptop and a projector to make their teaching dynamic and exciting for students in the twenty-first century learning environment. They described using PowerPoint presentations, YouTube, video animation, and Microsoft Word as some of the accessible and practical tools they described using to communicate their lessons. Almost all the respondents stated that they used Google Classroom as an online teaching and learning platform because it was user-friendly and convenient for both teachers and students to create classes and deliver them successfully at any time, and besides Google Classroom, the respondents also mentioned that they used Zoom, Telegram, Messenger, and other social media platforms as per the accessibility of the learners to make their teaching and learning more meaningful.

4.2.3 Challenges teachers faced while implementing ICT in teaching

First of all, according to respondents, teachers were frequently unable to offer teachings on time because they required time to continually change the projectors and screens in each classroom. This was because there aren't enough projectors and screens in each classroom. Secondly, they mentioned that weak wi-fi and slow internet connectivity interfere with their ability to provide lessons. It was interesting that one of the respondents brought out how practically “Every subject and class requires

internet access. Due to bad net access, we occasionally cannot offer our lesson as intended". Those were the few practical challenges faced by primary Bhutanese teachers while implementing ICT in their daily teaching.

CHAPTER 5

CONCLUSION, DISCUSSION, AND RECOMMEDATIONS

This chapter investigates the data analysis outcome, then discusses the results and offers recommendations for improving future research.

5.1 CONCLUSION

The purposes of this study were to examine primary Bhutanese teachers' perceptions and find out the practices towards the use of technology in teaching in Tsirang district. The study utilized both quantitative and qualitative methodologies. Hundred and fifteen respondents completed 23-item survey questionnaires. Additionally, 26 volunteers completed a 6-item semi-structured online open-ended question interviews. The qualitative data were then thematically analyzed. The information gathered using a survey research methodology led to the conclusion that follows.

The integration of ICT by teachers is essential to the teaching and learning process, however, how a teacher perceives and uses ICT in their everyday teaching is entirely up to them. The most important ones are teacher competency, the ability to incorporate technological resources into the learning environment, and a comprehensive technology curriculum. The use of ICT tools in education is significantly influenced by teachers' professional competency and perceptions of ICT benefits. According to Yamaguchi and Takada (2018). Teacher cooperation also has an impact on teachers' perceptions of using digital content for student-centered education as well as endogenous teacher-level factors like job satisfaction and self-confidence. Thus, this research examined how primary teachers in Bhutan responded in four different categories while using technology in their teaching.

The four areas of teachers' perceptions and practices were: 1) Teacher Awareness of ICT, 2) Teacher Ability on ICT, 3) Teacher Readiness toward the use of ICT in Teaching, and 4) Challenges while using ICT in Teaching. Despite the variations in each respondent's individual ratings, there was consistency in the respondents' analyses.

5.1.1 Teachers' perceptions, and practices towards the use of ICT in teaching

The research's major goal was to o examine primary Bhutanese teachers' perceptions towards the use of technology in teaching, and the second objective was to find out the primary Bhutanese teachers' practices towards the use of technology in teaching in Tsirang district. In order to gather data, 23 survey questions were separated into four categories: challenges associated with utilizing ICT in the classroom, teacher awareness of ICT, teacher ability to use ICT in the classroom, and teacher readiness for using ICT in the classroom. One hundred and fifteen primary school teachers responded to the poll. The following is a summary of the survey investigation's findings.

The survey questionnaire's answers were examined using means and standard deviation utilizing computer software. With a total mean of 3.7, the primary teachers in the Tsirang district had a high level of teacher perceptions and practices about the use of ICT in teaching. Teachers' readiness to use ICT in the classroom (Mean=3.9) was at a high level, which was followed by their perception of ICT's abilities (Mean=4.3). The challenges associated with using ICT in teaching received the lowest mean score among the four groups of teacher perceptions and practices, at 2.6. This demonstrated that despite their high degree of ICT proficiency, teachers face few challenges when integrating ICT into their daily lessons.

Twenty-six respondents voluntarily agreed to take part in the semi-structured online open-ended question interviews. The data were analyzed using the thematic approach. Nearly majority of the respondents concurred that teachers must incorporate

ICT into their teaching. The interviews' findings also indicated typical ICT platforms, tools, and challenges teachers encountered while incorporating ICT into their regular teaching. The following is a summary of the main conclusions drawn from the survey questionnaire and the semi-structured online open-ended question interviews.

5.1.2 Teacher Awareness of ICT

Although the respondents worked in semi-urban and rural schools in the southern district with limited ICT resources, however, their awareness of ICT was rated at a high level since they believed that integrating ICT into their daily teaching was essential in this digital age to improve teaching and learning for students in the 21st century.

5.1.3 Teacher Ability on ICT

The majority of respondents stated that they were confident integrating, and using various ICT tools in their regular teaching. Nevertheless, they still desired timely ICT training to scale up their abilities and improved their knowledge for better performance.

5.1.4 Teacher Readiness toward the use of ICT in Teaching

According to the findings, respondents delivered their everyday lessons utilizing ICT tools like a projector and television screen. Power point presentations, YouTube, video animation, and Microsoft Word were the most popular ICT tools they utilized in their teaching since they worked well to actively engage the students.

5.1.5 Challenges while using ICT in Teaching.

In order to develop intelligent learners, the new curriculum required teachers to design creative learning environments. However, while teaching, teachers dealt with real-world difficulties. Numerous responders regularly stressed that their ability to

teach was hampered by the lack of ICT facilities in the classroom, such as a projector with inadequate wi-fi and slow internet connectivity. This indicated that the school administration needed to seek necessary support from the relevant agency to provide better ICT facilities to create a happy learning environment for both the teachers and learners to enhance the academic standard.

5.2 DISCUSSION

The relevant findings of the study had described by the researcher in the following order, which corresponds to the two research objectives:

5.2.1 Findings from the respondent's survey questionnaire

This study focused on the perceptions and uses of technology in education among primary teachers in the Tsirang district. To investigate their perceptions and practices about the following aspects of ICT use in the teaching: teacher awareness of ICT, ICT ability, ICT readiness for use in the classroom, and ICT challenges. The study's conclusions showed that primary teachers in the Tsirang district had a positive attitude toward incorporating ICT into their regular lessons. Their overall mean score of 3.7 made it abundantly evident that they had a high level of practices and perceptions.

In order to bolster the aforementioned findings, schola Dastjerdi (2016) pointed out that teachers' perceptions of various ICT elements, such as the ease of use, value, and efficacy of utilizing ICT in education, have a big impact on how they use the technology. It shown that educators who saw the use of ICT in education more favorably incorporated it into their regular lessons. In other words, as instructors' opinions on technology use change, so does their use of it, and vice versa. The findings demonstrated that the availability of ICT in schools, the literacy and informational abilities of teachers, and the attitudes of teachers toward using ICT in the teaching-learning process all had a substantial impact on the use and implementation of ICT in teaching.

The ability onICT was at the greatest level among primary teachers' perceptions and practices toward using ICT in their everyday teaching (Mean=4.3), followed by teachers' readiness toward using ICT in teaching (Mean=3.9) at the high level. The majority of interviewees felt that incorporating ICT into their regular teaching was essential since the curriculum for the twenty-first century needed technology for efficient and uncomplicated teaching and learning, which further supported this conclusion.

They employed ICT tools, such as a projector, television screen, PowerPoint presentations, YouTube, video animation, and Microsoft Word, in their lessons because they helped pupils become more engaged. Additionally, it was in line with research by Wastiau et al. (2013) and Akram et al. (2022), which shown that effective teachers used all available technology to benefit their students. Accessibility was not the only factor influencing their views and degrees of comfort using ICT. They believed that utilizing technology in the classroom helped them sharpen their instructional techniques, provide fun, interactive learning opportunities, and keep students interested.

The problems associated with utilizing ICT in teaching had the lowest overall mean score of 2.6 out of the four categories of teacher perceptions and practices towards the use of ICT in teaching. This resulted from the short amount of time available for using ICT resources, erratic internet connection, and fluctuating electricity. The results were consistent with the Abbasi et al. (2021) study, which found that although the transitional phase had aided in their development, teachers still struggled to successfully integrate ICT into their teaching methods due to a lack of technological competency. Due to a lack of ICT infrastructure, internet access, electricity, technology, and challenges with teacher preparation, developing nations like Pakistan had difficulty implementing ICT in education effectively. These conclusions therefore supplied a convincing basis for the target areas and made suggestions to the appropriate agency on how to overcome challenges to improving teachers' performance in the field of ICT usage in teaching and learning.

5.2.2 Findings from the Semi-structured online open-ended question interviews

A survey on teachers' perceptions and practices on the use of ICT in their daily teaching was supplemented by a semi-structured online open-ended question interview with 26 volunteers from 13 primary school teachers. As the world develops toward a digital system that makes it simpler to draw attention to and boost learners' interest in the lesson, all of the respondents thought that teachers must use ICT into their lessons. Many Bhutanese teachers are still unable to use ICT successfully in their daily teaching, according to a survey by Dorji (2021). Furthermore, this study discovered that primary teachers in the Tsirang district were at ease using whatever ICT resources that were available in the classroom to make their teaching relevant. The result is consistent with Onalan and Kurt (2020), and the Bhutanese Ministry of Education (2019). It was claimed that combining technology with successful teaching strategies could improve and accelerate the teaching and learning process. The ability of a teacher to incorporate ICT into their lessons was used to gauge the quality of teacher preparation.

Through the interview, several challenges were also discovered in addition to the significant advantages. Lack of ICT resources, such as a projector with a weak wi-fi signal and insufficient internet connectivity hinders teachers' ability to use ICT in their everyday teaching. Anthony, Ghavifekr, Kunjappan, and Ramasamy conducted a study on (2015). Similar perceptions had also highlighted the challenges faced while using ICT tools by teachers, including limited accessibility, network connectivity, insufficient technical support, a lack of suitable training, time restraints, and teachers' level of expertise. The research by Choeda et al. (2016) revealed that the primary problems included a lack of training in ICT pedagogy, slow internet, and erratic internet service. They came to the conclusion that removing these obstacles will increase faculty motivation to include ICT into their routine teaching.

Despite the fact that the school administration was actively encouraging teachers in the deployment of ICT, teachers claimed that they needed timely resources

and professional helped to scale up their ICT abilities in order to stay up with emerging technology. This was also emphasized in a paper by Akram et al. that was released in 2022 and which cited a number of obstacles to successful technology integration in teaching-learning activities. These difficulties included a lack of funds, a lack of leadership support, a lack of time, unclear policies, a lack of professional development, a lack of technical assistance, and a lack of suitable pedagogical models. They also included a lack of ICT infrastructure accessibility. In order to reap the benefits of technology-integrated teaching and learning, concerned authorities should focus on the needs and gaps that prevent educational practices from properly integrating technology.

5.3 RECOMMENDATIONS

5.3.1 Recommendations for implementation

1) In this 21st-century learning environment, the successful integration of ICT in teaching and learning have been established. In order to make teaching lifelong learning, ICT tools usage should be promoted in every subject.

2) The selection of more pertinent educational materials is a further factor to take into account while utilizing ICT tools to engage students. This study found that when teachers employ interactive ICT tools in their lessons, students pay more attention.

3) To improve services, district-level policymakers and supervisory authorities must promptly offer professional development programs on emerging technologies and provide sufficient ICT resources for teachers.

5.3.2 Recommendation for future research

To carry out further research, the researcher would like to recommend future researchers as follows:

1) Only 115 teachers from 13 primary schools in the Tsirang district wereIncluded in this study. In order to support and ensure the reliability of the conclusion obtained from this study, a similar study may be carried out with a larger sample from different parts of the nation.

2) Other educational levels in the nation, such as ECCD, primary, secondary, higher secondary, and college levels, may be included in future research of this type.

3) Similar research can be done on subject-specific teachers who teach in Dzongkha, English, math, science, and social studies.

4) The opinions of students and parents toward the use of ICT in the classroom need to be further investigated.

5) Future research should carry out similar research based on teaching experiences and the qualification level of teachers.

According to the study's findings, the ICT knowledge and skills of primary teachers in Tsirang district were satisfactory. Teachers are prepared to use a variety of ICT tools in their daily teaching to enhance the effectiveness of their lessons, but they require prompt assistance from policymakers and the school administration in order to have adequate ICT resources and advance their knowledge of new technologies.

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APPENDICES

APPENDIX A

DETAILS OF TEACHERS UNDER EACH SCHOOL, TSIRANG DISTRICT

Details of teachers under each school, Tsirang District

Sl. No	Name of the School	Male	Female	Total
1	Barshong Primary School	3	2	5
2	Doongalangang Primary School	7	0	7
3	Gosling Primary School	6	3	9
4	Kilkhorthang Primary School	5	3	8
5	Mendrelgang Primary School	16	3	19
6	Nimazor ECR	1	1	2
7	Patshaling Primary School	7	1	8
8	Pemathang Primary School	5	3	8
9	Phuentenchu Primary School	5	5	10
10	Rangthangling Primary School	8	2	10
11	Semjong Primary School	5	4	9
12	Sergithang Primary School	5	5	10
13	Tsholingkhar Primary School	8	2	10
Total		**81**	**34**	**115**

Source: From the School Principals of Tsirang District 6th April 2022

APPENDIX B

RESPONDENTS DETAILS

Respondents Details

Respondents (R)	Gender	School Location	Teaching Experiences	Qualification	Subject
R 1	Female	Semi Urban	1-10 years	Others	Dzongkha
R 2	Female	Semi Urban	11-20 years	M.Ed	English
R3	Female	Semi Urban	1-10 years	B.Ed	English
R4	Female	Semi Urban	1-10 years	B.Ed	Social Studies
R5	Female	Semi Urban	1-10 years	B.Ed	English
R6	Female	Semi Urban	1-10 years	B.Ed	Maths
R7	Female	Semi Urban	11-20 years	B.Ed	Dzongkha
R8	Female	Semi Urban	11-20 years	PTC	Maths
R9	Female	Rural	1-10 years	B.Ed	Dzongkha
R10	Female	Rural	11-20 years	B.Ed	Dzongkha
R11	Female	Rural	11-20 years	B.Ed	Science
R12	Female	Rural	11-20 years	B.Ed	English
R13	Female	Rural	1-10 years	B.Ed	English
R14	Male	Semi Urban	1-10 years	B.Ed	Maths
R15	Male	Semi Urban	1-10 years	B.Ed	Science
R16	Male	Semi Urban	1-10 years	B.Ed	Science
R17	Male	Semi Urban	1-10 years	B.Ed	Maths
R18	Male	Semi Urban	11-20 years	B.Ed	English
R19	Male	Semi Urban	11-20 years	B.Ed	English
R20	Male	Semi Urban	Above 31 years	M.Ed	English
R21	Male	Semi Urban	Above 31 years	PTC	Maths
R22	Male	Rural	1-10 years	B.Ed	Maths
R23	Male	Rural	21-30 years	PTC	English
R24	Male	Rural	11-20 years	B.Ed	Maths
R25	Male	Rural	11-20 years	B.Ed	Maths
R26	Male	Rural	11-20 years	B.Ed	Maths

APPENDIX C

RESEARCH INSTRUMENTS

Part I

SURVEY QUESTIONNAIRE

Instruction(s): The purpose of this survey is to find out Primary Bhutanese Teachers' Perceptions and Practice Towards the Use of Technology in Teaching. Please read the statement carefully and rate it accordingly. The confidentiality of your answer will be strictly safeguarded as per the Research Ethics. Therefore, the findings from your responses do not bear any implications and risks in the future.

PART I: Please kindly tick the appropriate box in providing your response to all questions asked.

Q1. Name of the School; (Optional)

_____

Q.2 Professional Qualification:

- PTC.
- ZTC
- B. Ed.
- MA/M. Ed
- Other (Specify) …….

Q.3 Location/Area:

- Rural
- Urban
- Semi Urban

Q.4. Experiences as a Teacher

- 1-10 years
- 11-20 years
- 21- 30 years
- Above 31years

Q5. Gender

- Female
- Male

Q. 6. A major subject that you teach: ……..

Part I

Description of Likert Scale

Description	Score
Strongly Disagree (SD)	1
Disagree (D)	2
Neutral (N)	3
Agree (A)	4
Strongly Agree (SA)	5

I. TEACHERS' PERCEPTIONS TOWARDS THE USE OF ICT IN TEACHING							
a. Teacher Awareness Of ICT		SD 1	D 2	N 3	A 4	SA 5	
1	My teaching demands use of ICT.						
2	Students can participate more actively and be more involved in the lesson when ICT is used in the teaching.						
3	Some of the greatest social media platforms for teaching and learning include Google Classroom, Facebook, Messenger, Telegram, WeChat, WhatsApp, Zoom, and Voov.						
4	In my opinion, ICT use helps to produce teaching resources and raises the standard of teaching.						
5	I think my ICT proficiency impact teaching.						
6	My school has a policy for upgrading ICT skills.						
7	My school provide timely ICT training to skill up my ICT knowledge.						
8	I would prefer chalk and chalkboard over ICT tools.						
9	When teachers encounter problems with ICT, school administrator offers technical assistance.						
b. Teacher Ability in ICT							
10	I can design lesson plans for efficient teaching using a desktop or laptop with confidence.						
11	I am comfortable incorporating ICT into my regular teaching.						
12	I am comfortable to use all kinds of ICT equipment's that are available at the school.						

II. TEACHERS' PRACTICES TOWARDS THE USE OF ICT IN TEACHING						
	a. Teacher Readiness towards the use of ICT in teaching	SD 1	D 2	N 3	A 4	SA 5
13	I have a projector or television screen in my classroom that can be used for teaching.					
14	My lessons are significantly more effective when I include video in my teaching.					
15	When I incorporate audio into my teaching, they are substantially more effective.					
16	When I use PPT my lessons become much more effective.					
17	The internet at my school is consistently reliable.					
18	My school has a computer lab or room that is completely functional, and always available for teaching and learning purposes.					
	b. Challenges while using ICT in teaching	SD 1	D 2	N 3	A 4	SA 5
19	I don't have enough teaching time to use ICT.					
20	My use of ICT is discouraged by the school administration's lack of support.					
21	Due to the poor internet connection prevents me from adopting ICT tools in teaching.					
22	Fixing ICT equipment in the middle of a lesson takes time and lowers the quality of my teaching.					
23	My difficulty to use ICT in teaching is due to electricity fluctuations.					

Part II

SEMI STRUCTURED INTERVIEW QUESTIONS

Please kindly tick the appropriate box in providing your response to all questions asked.

Q1. Name of the School (Optional)

Q.2 Professional Qualification:

- PTC.
- ZTC
- B. Ed.
- MA/M. Ed
- Other (Specify) ……

Q.3 Location/Area:

- Rural
- Urban
- Semi- Urban

Q.4. Experiences as a Teacher

- 1-10 years
- 11-20 years
- 21- 30 years
- Above 31years

Q5. Gender

- Female
- Male

Q. 6. A Major subject that you teach: ----------

Questions

1. Do you believe integrating ICT in teaching is crucial? Why?

2. Which ICT tools are mostly used in your day-to-day teaching? Why?

3. Which online teaching platform do you prefer to use? Why?

4. What difficulties do you encounter while integrating ICT into teaching? How do you plan to address them?

5. Do you think a poor internet connection prevents teachers from adopting ICT tools? Why?

6. What type of ICT facility and support you need from the school administration?

APPENDIX D

IOC OF SURVEY QUESTIONNAIRE

I. TEACHERS' PERCEPTIONS TOWARDS THE USE OF ICT IN TEACHING						
a. Teacher Awareness of ICT		Expert 1	Expert 2	Expert 3	Average	Congruence
1	My teaching demands use of ICT.	+1	+1	+1	+1	Congruent
2	Students can participate more actively and be more involved in the lesson when ICT is used in the teaching.	+1	+1	+1	+1	Congruent
3	Some of the greatest social media platforms for teaching and learning include Google Classroom, Facebook, Messenger, Telegram, WeChat, WhatsApp, Zoom, and Voov.	+1	+1	+1	+1	Congruent
4	In my opinion, ICT use helps to produce teaching resources and raises the standard of teaching.	+1	+1	+1	+1	Congruent
5	I think my ICT proficiency impact teaching.	+1	+1	+1	+1	Congruent

6	My school has a policy for upgrading ICT skills.	+1	+1	+1	+1	Congruent
7	My school provide timely ICT training to skill up my ICT knowledge.	+1	+1	+1	+1	Congruent
8.	I would prefer chalk and chalkboard over ICT tools.	+1	+1	+1	+1	Congruent
9.	When teachers encounter problems with ICT, school administrator offers technical assistance.	+1	+1	+1	+1	Congruent
b. Teacher Ability in ICT		Expert 1	Expert 2	Expert 3	Average	Congruence
10.	I can design lesson plans for efficient teaching using a desktop or laptop with confidence.	+1	+1	+1	+1	Congruent
11.	I am comfortable incorporating ICT into my regular teaching.	+1	+1	+1	+1	Congruent
12.	I am comfortable to use all kinds of ICT equipment's that are available at the school.	+1	+1	+1	+1	Congruent

a. Teacher Readiness towards the use of ICT in teaching		Expert 1	Expert 2	Expert 3	Average	Congruence
13.	I have a projector or television screen in my classroom that can be used for teaching.	+1	+1	+1	+1	Congruent
14.	My lessons are significantly more effective when I include video in my teaching.	+1	+1	+1	+1	Congruent
15.	When I incorporate audio into my teaching, they are substantially more effective.	+1	+1	+1	+1	Congruent
16.	When I use PPT my lessons become much more effective.	+1	+1	+1	+1	Congruent
17.	The internet at my school is consistently reliable.	+1	+1	+1		Congruent
18.	My school has a computer lab or room that is completely functional, and always available for teaching and learning purposes.	+1	+1	+1	+1	Congruent

b. Challenges while using ICT in teaching		Expert 1	Expert 2	Expert 3	Average	Congruence
19.	I don't have enough teaching time to use ICT.	+1	+1	+1	+1	Congruent
20.	My use of ICT is discouraged by the school administration's lack of support.	+1	+1	+1	+1	Congruent
21.	Due to the poor internet connection prevents me from adopting ICT tools in teaching.	+1	+1	+1	+1	Congruent
22.	Fixing ICT equipment in the middle of a lesson takes time and lowers the quality of my teaching.	+1	+1	+1	+1	Congruent
23.	My difficulty to use ICT in teaching is due to electricity fluctuations.	+1	+1	+1	+1	Congruent
Overall Average		+1				Congruent

APPENDIX E

IOC OF SEMI STRUCTURE INTERVIEW QUESTIONS

IOC of Semi-Structure Interview Questions

I. TEACHERS' PERCEPTIONS TOWARDS THE USE OF ICT IN TEACHING						
Items		Expert 1	Expert 2	Expert 3	IOC Average	Congruence
1	Do you believe integrating ICT in teaching is crucial? Why?	+1	+1	+1	+1	Congruent
2	Which ICT tools are mostly used in your day-to-day teaching? Why?	+1	+1	+1	+1	Congruent
3	Which online teaching platform do you prefer to use? Why?	+1	+1	+1	+1	Congruent
4	What difficulties do you encounterwhile integrating ICT into teaching? How do you plan to address them?	+1	+1	+1	+1	Congruent
5	Do you think a poor internet connection prevents teachers from adopting ICT tools? Why?	+1	+1	+1	+1	Congruent
6	What type of ICT facility and support you need from the school administration?	+1	+1	+1	+1	Congruent
Overall Average		+1				Congruent

APPENDIX F

EXPERTS WHO VALIDATED THE RESERCH INSTRUMENT

Name of the Experts who Validated the Instruments

Sl. No	Name	Position Title	Institute
1	Mr. Gray Torremucha	Lecturer	Rangsit English Language Institute (RELI); Rangsit University.
2	Mr. Wangchuk	PhD candidate	University of Selinus in Italy.
3	Mr. Rigzin	Teacher	Khangrab Primary School in Bumthang.

APPENDIX G

RELIABILITY COEFFICIENT

Reliability Test

Case Processing Summary

		N	%
Cases	Valid	30	100
	Excluded[a]	0	0
	Total	30	100

Reliability Statistics

Cronbach's Alpha	N of Items
0.70	23

APPENDIX H
APPROVAL LETTERS

RSU มหาวิทยาลัยรังสิต RANGSIT UNIVERSITY

มหาวิทยาลัยรังสิต Rangsit University T. (66) 2997 2200-30
เมืองเอก ถ.พหลโยธิน Muang-Ake, Paholyothin Rd. F. (66) 2791 5757
ปทุมธานี 12000 Pathumthani 12000, Thailand E. info@rsu.ac.th

Director General
Department of School Education
Ministry of Education
Thimphu, Bhutan

Date: July 8, 2022

Subject: Request for Permission to Collect Data for Master of Education Theses

Dear Sir,

Master of Education Program in Curriculum and Instruction, Suryadhep Teachers College would like to request your permission for five Master of Education candidates to collect data for theses in Bhutan in the period of July 10, 2022 to August 20, 2022. The details of the candidates are shown as follows:

Sl. No	Name	Research Title	Research School
1	Tenzin Pema	The Application of Intensive Reading Approach with video for ELS Reading Comprehension Skill of Grade 6 Bhutanese Students.	Chumithang Middle Secondary School, Chhukha.
2	Leki Dorji D	The Application of Place-Based Education in Social Studies of Grade 5 Bhutanese Students.	Jyenkhana Primary School, Haa.
3	Pema Seldon	The Integration of Web Applications and Collaborative Learning in Mathematics for Grade 5 Bhutanese Students.	Phuentsholing Lower Secondary School, Phunentsholing Thromde.
4	Tshering Pem	The Application of Play-Based Learning for a Science Subject of Grade 5 Bhutanese Students.	Dechencholing Higher Secondary School, Thimphu Thromde.
5	Pema Dorji	The Study of Primary Bhutanese Teachers' Perceptions and Practices Towards the Use of Technology in Teaching.	13 Primary Schools, Tsirang.

Thank you for your kind consideration.

Truly yours,

NIPAPORN S'

Nipaporn Sakulwongs, Ed.D
Director of Master of Education Program in Curriculum and Instruction
Suryadhep Teachers College, Rangsit University
Muang-Ake, Paholyothin Road,
Lakhok, Pathum Thani 12000 Thailand

Mobile Number: +66-868846226
Telephone: +662997-2222 ext.1275

Royal Government of Bhutan
Ministry of Education
Department of School Education

Rethinking Education

DSE/SPCD/SLCU(2.1)2022/ 538

July 4, 2022

Chief Dzongkhag/Thromde Education Officers
Chukha, Haa and Tsirang Dzongkhag
Phuentsholing and Thimphu Thromde

Subject: Approval to collect data for Master of Education Thesis.

Dear Sirs/Madams,

The Director, Master of Education Program in Curriculum and Instruction at Suryadhep Teachers College, Rangsit University in Thailand has written to the Ministry seeking permission to conduct data collection from the attached list schools for thesis writing of our teachers who are undergoing their Masters Degree at Rangsit University.

To this effect, the Ministry of Education is pleased to accord approval for collection of data as per the list from the month of July to August, 2022. However, the researchers are requested to carry out the task without affecting the normal instructional hours.

Therefore, you are requested to kindly facilitate the researchers to collect data for their theses please.

Thanking you,

Sincerely yours,

(Karma Galay)
Officiating Secretary

Copy to:
1. Principals of the listed schools for kind information and support
2. Director, Master of Education Program in Curriculum and Instruction, Suryadhep Teachers College, Rangsit University for kind information
3. Chief Program Officer, SPCD, DSE for kind information

Mr. Pema Dorji
Education Sector, Tsirang hereby approved the collection of data from schools under Tsirang Dzongkhag required for your Master of Education Thesis. However, you are requested to conduct without disturbing the instructional hours. Best of luck!!!

21/07/2022
Chief DEO
Dzongkhag Administration
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BIOGRAPHY

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