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Exploring ICT Integration in Teaching Practices: A Qualitative Case Study of Secondary School Teachers in Public Schools of Sialkot

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ARTICLE INFO	ABSTRACT
Received: May 23, 2026 Revised: June 08, 2026 Accepted: June 26, 2026 Available Online: July 10, 2026 Keywords: <i>ICT integration, teacher education, secondary public schools, qualitative case study, teacher training, Sialkot</i> Corresponding Author: m.jamil@gcwus.edu.pk	This study explores the integration of Information and Communication Technology (ICT) in classroom teaching practices of public secondary schools of Sialkot. The study focused on the teachers' perspective, ICT training experiences, use of ICTs in the classroom and challenges faced by the teachers regarding the integration of ICT. It was a qualitative study with multiple case study research design. 10 public secondary school teachers were selected through purposive sampling. Data were collected using semi-structured interviews and analyzed through reflexive thematic analysis. According to the analysis, themes derived from data were ICT integration as a pedagogical approach to enhance teaching and learning, gaps in teacher preparedness for ICT integration, selective classroom use of ICT with limited assessment integration and converging barriers to effective ICT integration. According to the participants' perspective, ICT can provide them with a valuable teaching aid, particularly using videos, diagrams, animations, maps, PowerPoint slides, and the internet to facilitate the delivery of hard-to-understand concepts. The participants also reported increased attention, interest and participation of students in the classroom with the use of ICT. The use of ICT in lesson planning and classroom explanation was primarily used, with limited use in assessment and feedback. It was revealed that teachers' use of ICT was constrained by low-quality resources, unreliable internet, lack of technical support, teacher training needs, lack of confidence, class size and time pressure. Teacher training for use of ICT in the classroom should be practical and subject-oriented. ICT infrastructure and subject learning materials should be available with continuous institutional support.

Introduction

ICT integration has become a major concern in school education because teaching is no longer limited to textbooks, blackboards, and lecture-based methods. Gómez-Fernández and Mediavilla (2022) are of the view that the factors that affect the way teachers

use ICT in the classroom are at several levels. Many classrooms have students who are already aware of digital media, and teachers are not necessarily ready to make good use of ICT. The major issue is not whether there are computers, projectors or the internet. The core problem is whether teachers are sufficiently trained and confident, have appropriate subject-specific digital skills and school-based support to effectively use ICT in actual classroom contexts. Digital competence should go beyond the technical skills of teachers and be divided into pedagogical, ethical, professional and content dimensions (Falloon, 2020).

The role of teacher education is a crucial one in this process. Teacher education programs may only offer teachers general computer training; teachers may know how to operate tools but not use them in classroom teaching. The importance of practical, ongoing, subject-specific, and classroom-related training is highlighted in the effective use of ICT in education (Amemasor et al., 2025; Jamil et al., 2026). They also identified hands-on digital professional development, mentoring, collaboration, and institutional support as useful professional development since technology has an important role in schools (Jamil et al., 2024; Shahid et al., 2026).

Public schools are still disturbed by many serious barriers to ICT integration. Weak internet, lack of projectors, shortage of new computers, lack of smartboards, less technical support, large class size and exam pressure are some of the barriers. The key factors that influence the integration of ICT in secondary schools include infrastructure, professional development, school support and teachers' digital knowledge (Msambwa et al., 2024). Similarly, teachers also have positive attitudes towards the use of ICT, but the lack of facilities and training has limited the teachers' use of ICTs (Chaiban & Oweini, 2024; Nawaz & Nasreen, 2024). But it is not just a matter of teacher resistance. Teachers are willing to use ICT in many situations, but do not use it regularly and confidently in the school environment.

The use of ICT in public schools of Pakistan is not yet uniform. Limited or shared computer labs or projectors, if available, are not maintained in some schools. Mobile phones, YouTube, PowerPoint slides, WhatsApp or online images are used by the teacher, but not always in lesson planning, in assessment or in feedback. The studies conducted in Pakistan also reveal the issues of digital skills, infrastructure, and institutional support faced by secondary school teachers (Alam et al., 2024; Mehmood et al., 2025; Wajid et al., 2025). These problems are more apparent in public schools where teachers have to manage students in large classes, with low resources and a stifled syllabus.

The present study is guided by the thought that access to ICT is not enough to make it good integration. It involves a purposeful connection between teacher education, teacher confidence, subject content, pedagogy and school support that is purposeful. Thus, this study is oriented towards secondary public schools of Sialkot to get the perception of the teachers regarding integration of ICT in teaching, perception regarding teacher education and training, their use of ICT in classroom teaching and the challenges faced by them.

Research Objectives

This study was guided by the following research objectives:

1. To explore secondary public school teachers' perceptions of ICT integration in teaching and learning.
2. To examine how teaching practices prepare teachers for an ICT-based classroom.
3. To investigate how teachers use ICT tools in their classroom teaching.
4. To identify the major challenges teachers face in integrating ICT.

Review of Literature

ICT Integration in Secondary Schools

ICT integration in secondary education is meaningful when technology improves the learning process rather than merely showing that digital equipment is available in a school. This separation is vital, as a laptop, projector or internet connection is only of educational value if it is directed towards a clear learning goal. Teachers can use videos, diagrams, animations, presentations, maps and the internet to help explain concepts which might be harder to convey in the books and on the board.

According to Sailer et al. (2021), the importance of teachers' basic digital skills and technology-related teaching skills after a certain level of provision has been attained.

Data from Pakistan also strengthens the view for purposeful integration in the classroom. While investigating secondary school teachers in Karachi, Aslam et al. (2020) found that there was a significant correlation between technology integration and teachers' professional knowledge. But their results indicate that the use of ICT for assessment is still underdeveloped compared with other aspects. This is an important pattern to note, as many teachers tend to be more comfortable using technology to present and explain than they are to use it for feedback and assessment or for students to use for learning.

Also, the depth of classroom usage varies. The first phase of integration in many schools is within the teacher: teachers look for material, make slides and utilize visuals in their explanations. This is good, but not all the potential of ICT. Gómez-Fernández and Mediavilla (2022) demonstrated that there is an interplay between teacher and school factors that influence the use in the classroom. Over time, digital tools can also be used to collaborate, provide formative feedback, and engage in purposeful assessment. In public schools, this should continue to be realistic since not all students have access to a device or a reliable internet connection outside of school. The right use of technology is not in all lessons, but when it serves to clarify, engage, or enhance access to learning.

Teacher Readiness, Digital Competence, and Professional Training

Teacher plays a central role in education with the use of ICT. Hatlevik (2017) discovered positive relationships between teachers' self-efficacy, their digital competence, their information-evaluation strategies and the use of ICT in school. For a teacher, knowledge of how to use a cell phone or the internet may be enough, but they may still feel uncomfortable when making a digital lesson, searching for a reliable resource, or operating a projector in class, among others. Teachers' confidence is important because if technology is not commonly used, it will not be used often. Nikolopoulou et al. (2021) indicated that previous training in ICT had a positive impact on teachers' perceptions of the benefits of mobile learning and teachers' readiness to implement mobile learning in classrooms.

It is particularly important to have practical and ongoing training. Althubyani (2024) found that science teachers' digital competence was in the moderate range and they had mostly positive attitudes towards digital technology. This indicates that there is a distinction between willingness and competence. For teachers, there is a need for opportunities to develop real ICT-based lessons, practice how to use the usual equipment in the classroom, find appropriate resources for their subjects and address small technical issues.

Differentiated training should also take place. Some of the teachers may require step-by-step support with boosting their confidence; other teachers with basic skills may require support for digital assessment, student engagement and subject-specific applications. Aslam et al. (2020) also demonstrated the significance of the need for the development of digital-age assessment practices. Hands-on and subject-based professional development is therefore effective, tied to the practical circumstances in teachers' classrooms. Therefore, instead of providing single workshops, education authorities should provide opportunities for ongoing learning, practice and follow-up.

Barriers and Institutional Support for ICT Integration

The literature universally reveals an interdependency between barriers to the integration of ICT. Important barriers in high schools were found to be limited resources, insufficient training, and school-level conditions (Lomos et al., 2023). Drossel et al. (2017) reported that teacher attitudes, collaboration and school characteristics have an impact on how ICT is used. The teacher might have a positive attitude toward technology in and of itself but may not be using it as often when it is a shared resource, computers are old, Internet connections are not dependable, or there is no support for tech for technology's sake. ICT use becomes reliant upon individual effort, rather than the regular practice of teaching.

These concerns are especially relevant in the contexts of research in the developing world. Makki et al. (2018) found that the more difficult the resources are, the more crucial the teacher's attitude toward technology and participation in technology professional development becomes. Teachers may also be discouraged from preparing lessons using ICT due to large classes, short lesson time, pressure from examinations and workload. Additionally, Bell and Barr (2024) found that access, knowledge, training, beliefs and practices around the subject connected barriers.

The literature reviewed in this study suggests that effective integration of ICT is not the sole responsibility of the teachers. It must have a practical linkage between the infrastructure and the teachers' confidence, training, needs of the subject and institutional support. But teachers' experiences are influenced by the local context. Based upon these studies, there is a need to explore the experience of secondary public-school teachers regarding integration of ICT in their real classrooms.

Research Methodology

It was a qualitative study with a multiple case study research design. Case study research is useful for studying a real-life issue in its real-life context (Yin, 2018). 10 public secondary school teachers from Sialkot were the participants. The selection of the respondents was done based on purposive sampling due to their direct involvement in secondary-level teaching, and they had experience to share on the use of ICT. Purposive sampling is one of the sampling methods used in qualitative research where the sample is selected based on their ability to give rich and relevant data regarding the research problem (Patton, 2014). Semi-structured interviews were used to collect data. This approach was suitable since teachers were able to express themselves on their experiences, attitudes, and difficulties in their own terms. The interview guide comprised demographic questions and open-ended questions on the perceptions, training, classroom use and challenges of the use of ICT. In qualitative research, semi-structured interviews are helpful as it gives the interviews some structure and give the interviewees freedom of expression (Kvale & Brinkmann, 2009). All interviews were audio-recorded with the consent of the participants and lasted for 30-45 minutes. The interviews were transcribed and translated for further data analysis. Reflexive thematic analysis was used for data analysis. As described by Braun & Clarke (2006), it is a process of familiarizing oneself with the data, generating codes, searching themes, identifying, analyzing and reporting patterns found in qualitative data. Firstly, careful reading of all the responses was done. Important statements were then identified, coded and classified into sub-themes. Major themes were broken down into similar sub-themes based on the research objectives, and then the report was written using quotes for each theme found in the study.

Findings of the Study

The following themes and sub-themes present the findings of the study based on the study objectives.

Theme 1: ICT Integration as a Pedagogical Approach to Enhance Teaching and Learning (Objective 1)

The first theme addresses how public secondary school teachers in Sialkot perceived ICT integration in teaching and learning. From the interview data, it was revealed that most of the teachers had a positive and practical approach to the integration of ICT. They did not consider ICT to be a substitute for the teacher but rather a tool to support the teacher and enable lessons to be clearer, more visual and more interesting for the students. In the various subjects, teachers described how they use ICT to present difficult content, for example using videos, slides, diagrams, maps, animation, audio material and using real-life examples. This reflects a teacher's appreciation of the use of ICT in the classroom to explain, understand and participate. The following are further sub-themes

Subtheme 1.1: ICT as a Complementary Pedagogical Tool

The first sub-theme revealed that teachers thought of ICT as a facilitator of normal classroom teaching. They did not introduce the idea of the role of ICT as a substitute for the role of the teacher. Rather, they felt that technology is useful when it can clarify and meaningfully explain the lesson to the teacher. This perception is critical as it demonstrates that teachers are not spellbound by technology. They would like to see ICT linked with the aim of teaching and the needs of the classroom.

Teacher 1 stated,

For me, ICT integration means using technology in a way that supports the lesson. It is not just about showing a video or using a laptop. It means using digital tools to make the topic easier for students to understand.

Teacher 7 explained, *"ICT integration means using technology to make clear lesson planning and connect concepts with real examples. It should only support the teachers' teaching method, not to replace them."*

Teacher 9 added, *"ICT integration means using digital tools naturally in teaching. It should help students understand the topic*

better, not just make the lesson look modern."

Subtheme 1.2: Relevance of ICT for Learning in the Digital Age

Teachers show the importance of ICT for secondary-level teaching. ICT provides an opportunity to plan lessons more interestingly than a regular textbook lesson. This sub-theme suggests that teachers encourage the use of ICTs since it helps to make learning more concrete and practical. It enables teachers to convey what cannot be easily expressed in words. Thus, teachers' positive attitude towards ICT is closely related to its capability to make difficult content easy and make students understand and practice the content, especially in science subjects.

Teacher 3 said, *"I think ICT is very important in the modern age because it's the need to connect with technology. Positively used in class, it can make learning more meaningful."*

Teacher 4 explained, *"It is important because through visuals and figures, students understand concepts clearly. In Physics, topics like electricity, force, and motion become easier to learn when shown through animations or videos."*

Teacher 6 stated, *"Students need to learn and practice digital skills because it is important for the future and to compete in the digital age. Basic ICT exposure can improve and enhance their learning confidence."*

Subtheme 1.3: ICT-Supported Student Engagement and Active Learning

The third sub-theme focuses mainly on student engagement. Teachers pointed out that students who pay more attention to the subject are more active and show a greater interest when using ICT resources in the classroom. This significantly demonstrates that teachers do not only rely on and consider the value of the use of ICT in teaching and learning but also the students' reactions to the use of ICT.

Teacher 1 noted, *"Use of videos, pictures or presentations, students become more attentive. Weak students also show interest because the lesson becomes interesting through visuals from the regular lecture method."*

Teacher 9 shared, *"When students see visuals, they quickly understand the topic. They see and ask questions, and even weak students participate because the lesson becomes easier to follow and learn."*

Teacher 3 explained, *"In Biology, animations and videos help students understand processes like digestion, respiration, and cell division. Students ask more relevant questions when they can see the steps of the whole process."*

Subtheme 1.4: Contextual Enablers and Constraints of ICT-Supported Teaching

ICT has a role in connecting lessons to real-life situations. It also demonstrates that classroom interaction sometimes becomes challenging because the internet speed is slow and does not help in searching, the projector is not available, and electricity is cut off unevenly.

Teacher 2 explained, *"For trained teachers, it's easier, but untrained teachers face difficulty. For teachers like me who did not receive proper training, it can be challenging. Sometimes I feel low and prefer the traditional board method is faster."*

Teacher 10 narrated, *"For younger trained teachers, it may be easier. For old and senior teachers, it is sometimes very challenging because we did not get proper ICT training during our education because ICT was not focused on much."*

Theme 2: Gaps in Teacher Preparedness for ICT Integration (Objective 2)

The second theme explains how teachers perceived their ICT-based teaching preparations through a proper plan of teacher training and professional development programs. Teachers indicated that training had tended to focus on general ICT skills, and this was not always sufficient to face real-life situations, including ineffective resources, poor internet access, large classes, unavailable projectors, and a lack of technical support. One of the most prominent findings in this theme is the disconnect between the classroom and the training environment. The following are further subthemes.

Subtheme 2.1: Limited Pedagogical Preparation for ICT Integration in Pre-Service Teacher Education

Most teachers who had received formal training during their B.Ed. programs explained that training was helpful at the foundational level – covering PowerPoint, internet searching, and digital lesson planning – but inadequate when teachers came to apply these skills to real public-school classrooms with a limited number of resources.

Teacher 1 said,

I learned basic training during B.Ed. We were taught how to use PowerPoint, search material online, and prepare simple digital lessons. Later, I also attended one school-level training. It was helpful, but only at a basic level. It gave me confidence to prepare slides, but it did not train us how to manage ICT in a real public school classroom where resources are limited.

Teacher 3 explained, "Yes, it was helpful because it gave me basic skills. But real classroom situations and environment are different. In training, almost everything is available, but in school, we have to manage with limited resources."

Teacher 9 noted, "Yes, it was helpful because it gave me confidence. In training, all resources were available for practical understanding, but in school we have to adjust with limited facilities because real school situations are different from training."

Subtheme 2.2: Reliance on Self-Directed Learning and Peer Support for ICT Competence

A limited number of participants – especially older age, senior group of teachers – reported having not received proper ICT training during their pre-service preparation. These teachers explained whatever the digital skills they possessed through personal practice, internet exploration, or informal support from peers and family. They learned basic searching from surrounding.

Teacher 5 stated, "I did not receive formal ICT training during my teacher training. At that time, ICT was not much focused on. The main focus was more on lesson planning, teaching methods, and classroom management."

Teacher 8 explained,

I did not receive proper ICT training as ICT was not a major part of our education training. I learned and practised basic things myself, like using a mobile phone, searching videos, and using WhatsApp for sharing information. Since I did not get proper practical training to use a projector and prepare slides. Whatever I use in class, I learned mostly through personal practice and help from peers."

Teacher 10 said,

During my teaching, I did not receive ICT training. At that time, teaching was mostly focused on textbooks, blackboards, and the lecture method. My training was based on classroom management and lesson planning, but not for ICT. For technology, I still need basic practical training and guidance.

Subtheme 2.3: Variability in Teachers' ICT Confidence and Competence

Teachers reported that ICT tools ranged from basic tools to significantly lacking, with advanced applications, projection equipment, and online assessment platforms. Based on subject, knowledge was an important differentiator: the Computer Science teacher had the highest confidence in ICT usage while Urdu and Pakistan Studies teachers showed the lowest confidence in ICT.

Teacher 3 said, "Yes, I feel confident while using PowerPoint, mobile apps, and online diagrams. I also prepare my own slides for difficult topics. When they see practical demonstrations or use computers themselves, they understand better and participate more."

Teacher 6 stated, "Yes, I feel confident. I use computers, projectors, presentations, and online examples without much difficulty. Computer teachers are more confident and comfortable with ICT use."

Teacher 2 explained, *“Honestly, not fully confident. I can use a mobile phone and basic internet search, but I am not comfortable in preparing digital lessons or using online tools. I need help when using a laptop or projector.”*

Teacher 10 said, *“During my teacher education, ICT was not a major part of training. Not much. I can use a mobile phone and search basic material, but I am not confident using a projector or preparing slides on my own.”*

Subtheme 2.4: Need for Practical and Context-Specific ICT Professional Development

While continuing with the basic computer training, teachers called for practical, ongoing, differentiated training according to their subjects that explains the specific digital needs in their area and respect the different levels of expertise among teachers.

Teacher 1 explained, *“Teachers need practical training as per their subject requirements. They should be trained on how to use ICT with limited resources, how to prepare and plan subject-based digital lessons, and learn how to solve technical problems themselves.”*

Teacher 3 recommended, *“Teachers need to learn subject-based ICT training. For example, Biology teachers should be trained in using animations, science videos, digital diagrams, and simulation tools.”*

Teacher 2 added, *“Teachers need basic step-by-step training. Many senior teachers need confidence first. Training should start with simple things like using projectors, preparing slides, and using educational websites.”*

Teacher 10 concluded, *“Senior teachers need basic training first. The training should be slow, simple, and practical. It should not assume that every teacher already knows computers.”*

Theme 3: Selective Classroom Use of ICT with Limited Assessment Integration (Objective 3)

The third theme addresses data obtained from revealed that teachers had varying experiences and ways in which they were using ICTs based on their subject and confidence level, training and school resources. Most teachers had access to standard equipment including mobile phones, laptops, projectors, PowerPoint slides, videos on YouTube, online diagrams and educational websites, WhatsApp and in some cases, computer labs. But not all teachers used ICT in a regular fashion. ICT was primarily used in lesson planning and classroom explanations, particularly for visualizing difficult concepts – while also used for student assessment, homework, and feedback remained limited, informal, and constrained by infrastructure and student access.

Subtheme 3.1: Predominant Use of Basic ICT Tools for Classroom Instruction

Despite different backgrounds and subjects, teachers relied on similar and accessible tools: mobile phones, YouTube videos, PowerPoint presentations, internet images, and school projectors. The Computer Science teacher used computers and online platforms more confidently and efficiently.

Teacher 1 noted, *“I mostly use my mobile phone, laptop, PowerPoint slides, YouTube videos, and sometimes the school projector.”*

Teacher 5 (Urdu) said, *“I mostly use my mobile phone. Sometimes I use YouTube audio for poetry or pronunciation.”*

Teacher 6 (Computer Science) explained, *“I use computers, a projector, laptop, internet, PowerPoint, educational websites, and sometimes a mobile phone.”*

Subtheme 3.2: ICT-Supported Explanation of Complex and Abstract Concepts

Teachers consistently explained the use of digital tools for concepts that are difficult to understand and convey through a textbook or board alone – biological processes, chemical reactions, physical forces, geographical maps, and mathematical diagrams. All these applications explained a purposeful integration pattern to connect and tied to conceptual clarity.

Teacher 3 explained,

Before starting the class, I search for and practice diagrams, short videos, and animations. During class, I use different diagrams to describe many biological processes. I taught cell division to students with an animation. Students were confused about the stages, but after watching the animation, they understood each step of the process clearly.

Teacher 4 said, *"I used an animation in class to teach electric current and circuits. Students easily understood the process and flow of current clearly because they could see it visually. Visual learning is easy and interesting."*

Teacher 7 (Chemistry) noted, *"I showed a video to explain a chemical reaction that we could not perform in the school lab due to limited resources. Students understood the reaction by watching it."*

Teacher 10 (Pakistan Studies) explained that, *"Once I used a digital map to teach the class about the location of different regions during the Pakistan Movement. Students understood and learned the geographical side in a better way."*

Subtheme 3.3: Limited ICT Integration in Assessment and Feedback Practices

The overall data shows a huge gap clearly between ICT used for the teaching-learning process and its use for assessment. Almost all teachers relied on written tests, paperwork and notebooks for formal assessment. The basic channel for digital communication was WhatsApp only, used rarely or indirectly through class representatives, but not as a regular interactive tool.

Teacher 1 said, *"Sometimes I used WhatsApp to share homework instructions in a WhatsApp group through class representatives. I do not use online quizzes or tests on a regular basis because most students do not have smartphones or proper internet access."*

Teacher 2 stated, *"No, not properly; I used digital channels for homework. I mostly give written homework in class and check notebooks. Many students do not have smartphones, so online homework is difficult to assess all students."*

Teacher 10 explained, *"No, I do not use ICT for assessment. Sometimes in a week, we just practice basic computer. I only use written tests and notebooks for proper assessment. For homework, I mostly give instructions in class."*

Subtheme 3.4: Infrastructure-Dependent Frequency of ICT Use

Many teachers use ICT once a week or a month at most, with low frequency heavily affected by projector availability, electricity reliability, internet speed, and time required to set up equipment. Teachers feel confident with the use of basic tools, but resources are limited and not enough for all teachers. The Computer Science teacher was the exception; they almost used ICT daily in the classroom.

Teacher 1 noted, *"I use ICT maybe once or twice a week. It depends on the availability of the projector, electricity, and time. Sometimes setting up equipment takes too much class time."*

Teacher 3 said, *"I try to use ICT two to three times a week. It depends on electricity, projector availability, and the topic."*

Teacher 5 explained, *"I use it rarely. My confidence, lack of training, and lack of equipment are the main reasons."*

Teacher 6 stated, *"I use ICT almost daily because of my subject. The main issue is computer lab availability and the number of working computers."*

Theme 4: Converging Barriers to Effective ICT Integration (Objective 4)

The fourth theme presents a proper picture of the challenges that restrict ICT use in Sialkot's secondary public schools. The challenges were not only teacher skills-based, but also the school facilities, Internet access, equipment availability, class size, time pressure, workload and absence of technical support. Although the majority of teachers had a positive mindset towards ICT, it was evident that the teachers gave clear indications of the challenges of integrating ICT without a conducive school environment. These barriers did not operate in separate but reinforced each other, making sustained integration of ICT particularly difficult.

Subtheme 4.1: Inadequate ICT Infrastructure and Resource Accessibility

Teachers described that many schools had only one projector, a limited number of computers, weak internet, no smart boards, and shared computer labs. Because of this, ICT could not be used regularly in every classroom.

Teacher 1 said, *"We have a computer lab and one projector, but it is not always available. There is no smart board in our classrooms. Internet is also not reliable."*

Teacher 3 explained, *"The main difficulty is that ICT facilities are shared. Due to limited infrastructure, we manage; if one teacher is using the projector, I have to change my plan. Internet speed is slow, and shortage of electricity also disturbs class plan."*

Teacher 6 noted, *"Computers and projectors are available in limited numbers, which are not enough for all teachers to use. Internet is weak, and there are no smart boards."*

Subtheme 4.2: Insufficient Technical Support for ICT Integration

The significant issue was not having technical support in the schools. Teachers indicated when ICT failed, they generally relied on the computer teacher, younger teachers or their own inadequate abilities. In most cases, there was no adequate technical staff. This impacted on teachers' confidence as they were concerned that if equipment failed during class, time would be lost.

Teacher 2 explained, *"Only informally. If the computer teacher is free, he helps. Otherwise, there is no proper technical person."*

Teacher 3 said, *"Sometimes another teacher helps, especially the computer teacher, but not always. Mostly we manage to work on our own. If there is a technical issue, no proper technical support person in school and time is wasted."*

Teacher 10 noted, *"Usually, we ask the computer teacher or a younger colleague to help. There is no official technical support."*

Subtheme 4.3: Organizational Constraints on ICT Integration

The challenge was about time, workload and syllabus pressure, class size up to 50 students and classroom management. Teachers reported that there is an increased preparation time needed for using ICT in teaching. It is also time-consuming to set up equipment, set up the projector, and handle students in technology-supported lessons. It was challenging to manage ICT activities in large classes.

Teacher 1 stated, *"Electricity, lack of equipment, large class size, and fixed timetable are major issues. Sometimes there are 50 students in one class, so managing ICT-based activity becomes difficult."*

Teacher 2 explained, *"Time is a big issue. The syllabus is lengthy, and we have exam pressure. Teachers feel that using ICT takes extra time."*

Teacher 7 said, *"Workload, limited equipment, weak internet, and large classes affect ICT use."*

Subtheme 4.4: Experience-Related Differences in ICT Confidence and Support Needs

Some personal barriers — particularly lack of confidence, having no familiarity with equipment, and absence of prior training — made ICT use difficult for senior teachers rather than empowering for several teachers, especially those teachers who had trained before ICT was embedded in teacher education.

Teacher 10 said, *"I face difficulty in operating devices. Sometimes I need help even to connect the laptop with the projector. This makes me hesitant."*

Teacher 2 added, *"The first problem is lack of training. The second is lack of proper equipment. If equipment is available but the teacher does not know how to use it, then it is not helpful."*

Teacher 5 explained, *"I face difficulty in operating devices. Also, equipment is not always available when needed."*

Discussion

The findings of this study confirm that generally teachers' attitude towards the integration of ICT in secondary public schools of Sialkot was positive. They viewed the role of ICT as being a support for teaching, not a substitute for the teacher. The study's results align with earlier studies that have contended that technology is only meaningful if it is used in support of pedagogy and enhances classroom understanding (Fabian et al., 2024; Msambwa et al., 2024; Shambare & Jita, 2024). Teachers mainly used the ICT to provide explanations of difficult topics using videos, diagrams, maps, animations, PowerPoint slides and online examples, as observed in this study. This indicates the teachers' appreciation of ICT, where it helped to clarify and visualize the learning. Ahmad et al. (2024) also revealed that the use of ICT in teaching is beneficial when teachers make use of ICT to enhance access, explanation and engagement in learning. Teachers explain that ICT is not a replacement for good teaching but as a contextually useful tool for clarifying abstract concepts, motivating students and connecting specific content to visual reality – a pattern consistent with the purposeful integration literature cited in the article. However, the overall data shows that the real use of ICT in teaching is in the phase of lesson planning, explanations, with little extension into student-led activities, practical performance, formative assessment, or interactive feedback, which echoes the patterns identified by Aslam et al. (2020) regarding underdeveloped digital assessment practices in Pakistan.

The research argues that access alone does not constitute integration of ICT because a huge, clear training gap was identified across participants. Teachers who had not received proper formal ICT training reported lower confidence, poor familiarity with ICT tool use, and dependence on informal peer and family support – findings consistent with Hatlevik's (2017) evidence that teacher self-efficacy, confidence and digital competence are positively linked to actual ICT use. The demand for special training in subject-specific, proper command of practical performance in that area and differentiated training reflects what Althubayani (2024) identified as the gap between willingness and competence – teachers may be appreciated to use technology, but the lack of training programs and the skills to integrate ICT meaningfully into their specific subject content and classroom conditions. Some of these barriers restrict the teacher and students' learning. The convergence of structural, institutional, and personal barriers in this study also aligns with Lomos et al. (2023) finding that ICT integration barriers are mutually reinforcing, making individual teacher efforts and trainings are insufficient without proper systemic school-level support.

Conclusion

This study concludes that public secondary school teachers in Sialkot recognize the importance of ICT in teacher training and classroom teaching practices. The results indicate that, in general, teachers' attitude towards ICT was positive. They saw the advantages of using ICT as a tool to assist in teaching, particularly when using videos, diagrams, maps, animation, PowerPoint presentations and online examples to explain challenging concepts and ideas. Teachers also mentioned that the use of ICT in the classroom made the students more attentive, active and interested. It was also discovered that teachers' education and professional training were important factors with regard to their confidence in using ICT and are willing to use digital tools purposefully, but their practice is limited to selective, teacher-centred use of basic tools – primarily videos, PowerPoint, and internet images – for concept explanation. The study further concludes that teacher education programs have not adequately prepared teachers for ICT-integrated classroom practice, particularly in terms of subject-specific digital pedagogy, confidence with common equipment, and the use of ICT for student assessment and feedback. Structural barriers including shared infrastructure, unreliable electricity, poor internet connection, lack of technical support, large class sizes, and exam pressure continue to suppress both the frequency and depth of ICT use across schools. Collectively, the findings establish that sustainable ICT integration in secondary public schools of Sialkot requires simultaneous investment in practical teacher training, reliable school-level infrastructure, institutional support systems, and subject-aligned digital resources – not any one factor in isolation.

Recommendations

The following are some recommendations based on the study findings.

- Introduce structured training in teacher education programs with practical, subject-specific ICT modules where every teacher prepares and delivers ICT-based lessons in simulated and real public school conditions.
- Basic training for ICT (confidence building) for senior teachers. This training should begin with the basic tasks of connecting a laptop with a projector, preparing basic slides, searching for safe educational videos, downloading material and using WhatsApp or Google Forms for simple tasks in class.

- A technical support person, for ICT-related matters, should be appointed or assigned to schools. One trained teacher/lab assistant should be available during school hours to assist with any issues during the time the projectors are set up, the internet connection, computer maintenance, and basic troubleshooting.
- Every secondary public school develops subject-wise, curriculum-aligned digital resource libraries – including animations, videos, simulations, and diagrams, so teachers do not waste time searching for and preparing all digital content independently within an already heavy workload.
- The use of ICT should not be reserved for inspections and/or formal visits. Teachers should be encouraged to make use of ICT in a normal teaching process.
- Reform assessment and examination structures to include scope for digital and project-based learning, reducing the exam pressure that currently discourages teachers' interests from investing time in ICT-based lessons.

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