The Role of Information and Communication Technology at the Intermediate level in District Sialkot

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Abstract: *This research scholar article aims to explore the role of information and communication technology (ICT) at the intermediate level in District Sialkot, Pakistan. The integration of ICT in the education sector has been recognized as a beneficial tool for enhancing the quality of education and contributing to the development of human capital. However, the acceptance and use of ICT in educational settings, particularly in remote and less developed areas such as District Sialkot, need a complete understanding of the influences that effect the acceptability and use of ICT. The Technology Acceptance Model (TAM), developed by Davis in 1989, is a theoretical outline from a qualitative perspective for understanding the adoption and usage of ICT in the educational context. According to the TAM, two main elements influence individuals' inclination to use technology: perceived usefulness and ease of use. This study would apply the TAM to the specific context of the intermediate level in District Sialkot to provide keen thought into the issues that influence the acceptance and utilization of ICT and to inform strategies for overcoming barriers to its effective integration in the region. The research article is composed of the data collected through qualitative interviews with selected principals of governmental institutions of the intermediate level. The study would also draw on existing literature to deliver an inclusive and in-depth understanding of the role of ICT at the intermediate level in District Sialkot, grounded in the Technology Acceptance Model. The findings of the study contribute to the existing literature on the adoption and use of ICT in educational settings, inform policy decisions to enhance the quality of education and contribute to the development of the region.*

Keywords: Information and Communication Technology, Intermediate Level Education, District Sialkot, Technology Acceptance Model, Educational Technology

1. Introduction

The role of information and communication technology (ICT) at the intermediate level in District Sialkot is a topic of significant importance, particularly in the context of the modern educational development of the region. The study attempts to provide a thorough grasp of the role of ICT at the intermediate level in District Sialkot, grounded in the Technology Acceptance Model (TAM) established by Davis. The study draws on existing literature to shed light on the factors that influence the getting and utilization of ICT and to inform strategies for overcoming barriers to its effective integration in the region.

The historical trajectory of technology transfer

from nations at the forefront of innovation to those with more cost-effective labor solutions has been a defining characteristic of global development from different perspectives. This pattern dates back to the relocation of textile manufacturing to Asia during the 18th and 19th centuries to the educational sector in the modern era. Currently, this dynamic is most evident in the information and communication technology (ICT) sector, which has experienced swift and transformative growth over the past fifty years, particularly with the rise of software as a dominant educational and industry component (Spence & Smith, 2009)

Throughout history, the transfer of technology has significantly altered the global educational landscape. Various educational sectors have migrated to regions offering advantages, leading to dramatic shifts in global production and modernized patterns. ICT itself, as a foundational element of the industry, has undergone exponential growth, establishing itself as a foundational element of modern learning centres (Donnera & Andres, 2008). This expansion has been instrumental in bringing about significant changes in the distribution of different activities on a global scale.

The latent of modern Information and Communication Technologies (ICTs) as catalysts for educational development is frequently highlighted in development discourse. According to Boas, Dunning, and Bussell (2005) and Heeks & Stanforth (2014), ICTs can drive growth by improving civic engagement and providing critical access to information and education. Conversely, Bowonder and Boddu (2005) note that marginalized populations in developing regions often face significant barriers to accessing information essential for improving their well-being. In this context, ICTs can be pivotal in providing access to basic livelihood-related information and aiding individuals in making informed decisions, thereby potentially reducing their vulnerability to poverty.

Furthermore, ICTs are viewed as instrumental in stimulating overall learning and educational progress by enhancing productivity and promoting human capital development, as suggested by Quibria, Tschang, and Macasaquit (2010). The penetration and utilization of ICTs in Pakistan are notable examples of this phenomenon. Despite the evident surge in ICT usage and its associated benefits in Pakistan, there remains a gap in understanding the full extent and impart of ICT-led growth creativities. The role these technologies play in improving the lives of millions throughout the country is still an area that requires further exploration and understanding. As such, it is crucial to delve deeper into the state of these initiatives and their effectiveness in advancing educational development in Pakistan.

The impact of ICT on global employment dynamics has been particularly noteworthy. The sector has been a source of numerous well-paying, white-collar jobs, especially beneficial for countries that, despite economic disadvantages, boast a highly skilled workforce. This development has effectively leveled the global economic playing field, allowing these nations to compete more effectively in the international arena.

1.1 Background

ICT has become an essential part of modern education, offering a variety of tools and possessions that can improve the coaching and education experience. From communicating boards and informative apps to online research and collaboration, ICT has the potential to transform the educational landscape, providing students with access to a wealth of information and enabling teachers to create engaging and interactive learning environments.

District Sialkot, located in the Punjab province of Pakistan, is home to a diverse and vibrant community. The region has made significant strides in improving its educational infrastructure in recent years, with a focus on expanding access to quality education for all students. However, like many other regions, District Sialkot faces challenges in integrating ICT into its educational system, including issues related to infrastructure technical training, and policy implementation.

At the intermediate level, students are at a

critical stage in their educational journey, preparing for higher education and the workforce. The effective integration of ICT at this level can help students develop essential digital literary skills, critical thinking, and problem-solving abilities, which are vital for success in the 21st century. Additionally, ICT can provide access to a wide range of educational resources, enabling students to explore diverse subjects and interests and to develop a deeper understanding of the world around them.

1.2 Davis' Technology Acceptance Model (TAM) as the Theoretical Framework

The Technology Acceptance Model (Tam), developed by Fred Davis in 1989, is an information systems theory that explains how users of technology accept and utilize it. The concept states that users' behavioral intentions, which are determined by how beneficial and easy they believe technology to be, can forecast the adoption of new technologies. The primary feature of this model is its focus on the perceptions of potential consumers. In other words, even if a technological product's creator thinks it's useful and easy to use, potential customers won't accept it unless they think the same thing.

The model proposes that when consumers are introduced to new technology, their behavioral intention to use the technology is influenced by their attitude or overall opinion of the technology. According to the paradigm, the actual system use is the endpoint at which people use technology. The model was further verified by establishing statistically significant correlations between perceived utility, perceived ease of use, intention, and use behavior.

The model depicts the behavior; the generic aspect of TRA sparked much debate about its theoretical limitations (Bagozzi and Warshaw, 1989; Bagozzi, 1981). The model did not include variables unique to technology use. As a result, researchers have to discover the factors relevant to the use of technology and information. To address the limitations caused by a lack of a theoretical model and measurement scales, Davis created the technology acceptance model (TAM). By applying the TAM to the specific context of the intermediate level in District Sialkot, this study hopes to provide useful insights into the elements that influence ICT acceptability and utilization, as well as to guide strategies for overcoming impediments to its effective integration in the region.

1.3 Objectives of the Study

The primary objectives of this paper are to:

- Investigate the current level of ICT integration at the intermediate level in District Sialkot.
- Identify the factors that influence the acceptance and utilization of ICT by teachers and students.
- Inform strategies for overcoming barriers to the effective integration of ICT in the region.

To achieve these objectives, this research proposes to donate to the existing literature on the adoption and use of ICT in educational settings and inform policy decisions to enhance the quality of education and contribute to the socio-economic development of District Sialkot.

2. Literature Review

Understanding the role of information and Communication Technology (ICT) in education, particularly at the intermediate level in District Sialkot, necessitates a review of existing literature within the framework of Davis's Technology Acceptance Model (TAM). This model, developed by Davis, provides a theoretical basis to assess how users learn to accept and use technology. It primarily focuses on two factors: perceived usefulness and perceived ease of use (Davis, 1989)

Numerous studies have explored the integration of ICT in education. Alavi and Leidner (2001) argue that ICT enhances learning processes by facilitating the access to and dissemination of information. This is particularly relevant in the context of Sialkot, where there could be a lack of educational resources. ICT can close this gap by giving users internet access to a multitude of knowledge and learning resources.

In a study focusing on developing countries, Buabeng-Andoh (2012) highlights the positive impacts of ICT on educational outcomes. However, he also notes challenges such as inadequate infrastructure and training, which are pertinent issues in District Sialkot. These challenges align with the observations made by Hussian et al. (2019), who emphasize the need for adequate ICT infrastructure and teacher training in Pakistani schools for ICT integration.

The relevance of TAM in this context lies in understanding teachers' and students' acceptance of ICT. Teo (2011) employed TAM to examine teachers' perceptions of ICT in education, finding that perceived ease of use significantly affects teachers' attitudes towards adopting ICT. Similarly, a study by Schepers and Wetzels (2007) demonstrates that the perceived usefulness of ICT is a strong predictor of its acceptance and usage. These findings suggest that for successful implementation of ICT in Sialkot's intermediate schools, both the utility and usability of technology must be emphasized.

Research on ICT in education often highlights the importance of attitude towards technology. A study by Venkatesh and Davis (2000) extends TAM by proposing the Unified Theory of Acceptance and Use of Technology (UTAUT), which includes factors such as social influence and facilitating conditions. These factors are crucial in the Sialkot context, where societal attitudes and institutional supports play a significant role in the adoption of ICT.

In the article "ICTs and Development in Pakistan: An Review" (2019), Muhammad Arif talked about how the review examines the role of information and communication Technologies (ICTs) in Pakistan's socioeconomic development. It reviews Literature on ICT4D and Information Systems, focusing on Pakistan. The findings are that ICTs are transforming Pakistan, improving access to financial and health amenities through Mobile Money and Telemedicine, though primary data is unavailable.

In another article "Application of Information Communication Technology at Secondary School Level and Its Practices" (2021), Navid and Iftikhar investigate the use and acceptability of ICT in secondary schools in Punjab province. It focuses on higher school teachers and students, revealing constraints and flaws in the implementation of ICT programs. Power outages can prevent students from meeting their educational goals, emphasizing the need for well-organized, well-equipped computer labs and devoted ICT experts.

Rizwan Ilyas and Sadia Azam in one of their articles, "Learners Autonomy: Effectiveness and Challenges at Intermediate Level in Punjab, Pakistan" (2022), evaluate the effectiveness of introducing learner autonomy in developing intermediate writing skills in ESL classrooms in Punjab, Pakistan. Results show that lecture-based students show better results, while student-centred students show small growth. The research aims to remove barriers and promote learner autonomy for English language acquisition.

"The Impact of Communication Technology on the English Language in Pakistan" is an article (2019), by Faiza Masood and Irum Rubab. This research examines the influence of communication technology changes on English language use in classrooms. It interviews 200 graduate and master's level students and examines the effect of text messaging shortcuts on their writing tasks.

Dr Hari Krishan & et al. in one of the articles "Information and Communication Technologies (ICT) as Social Innovation and Public Governance Tool for a Developing Country" (2022), explores the role of information and communication Technology (ICT)in Pakistan's socio-economic development, revealing its transformative effects on the economy and digital services, benefiting millions.

In a thesis titled "Impact of Information and Communication Technology on Decent Work in Pakistan" (2004), Athar Muhmood and Qamar Ali concluded that Pakistan established an independent Division of Information Technology and Tele Communication in 1997 to address globalization challenges. However,

limited resources and a lower priority for IT have hindered progress. Private training institutions have led to low-skilled manpower, structural unemployment, and a mismatch between demand and supply.

In the article "Role of ICT Shaping the Future of Pakistani Higher Education System" (2011), Zaffar Ahmad, and Shakeel Ahmad analyzed the Pakistani higher system's (HES) challenges in integrating ICT. It found significant gaps in ICT demand, supply, and use, as well as issues with ICT-based higher education. The study argues that an effective ICT policy could improve Pakistan's knowledge-based education. According to the study, an effective ICT strategy might boost Pakistan's knowledge-based economy and promote ICT policy and planning in higher education.

In the article "ICT in Education: A Critical Literature Review and Its Implications" (2013), Jo Shan Fu reviews ICT integration in education, focusing on its benefits, challenges, factors influencing success, attitudes, and confidence of teachers, and the importance of school culture.

These studies provide valuable insights into the role of ICT in education and its relevance to the context of District Sialkot. They emphasize the importance of ICT in enhancing technology and learning processes, as well as the challenges faced by educational institutions in implementing ICT initiatives. By building on these findings, this study aims to provide a comprehensive understanding of the role of ICT at the intermediate level of District Sialkot, grounded in the TAM, and inform strategies for overcoming barriers to its effective integration in the region.

3. Research Methodology

This research scholar's article's objective is to examine the role of information and communication technology (ICT) at the intermediate level in District Sialkot, Pakistan, using Davis's Technology Acceptance Model (TAM), developed in 1989. The study uses current literature to provide knowledge and need of the role of ICT at the intermediate level in District Sialkot. The research design is a qualitative method approach, incorporating qualitative data collection techniques through interviews and existing literary sources. The study is based on conducting interviews to obtain qualitative data from selected intermediate-level heads of the institutions in District Sialkot. The interview questions are based on the TAM's constructs, such as perceived usefulness and progressiveness for the region.

In addition, the study also uses semi-structured interviews to collect data from key stakeholders: educational government officials. The semi-structured interviews are designed to explore the barriers and facilitators to the adoption and use of ICT at the intermediate level in District Sialkot, as well as the potential strategies for overcoming these barriers. The data collected from the existing literature with semi-structured interviews is analyzed using the descriptive method, as well as thematic analysis, to test the hypothesis developed based on the contracts of the ATM. The thematic analysis would be refined to analyses the qualitative data gathered from semi-structured interviews, identifying key themes and patterns.

1. Findings

In 1989, Davis created the Technology Acceptance Model (TAM), a well-known theoretical framework that clarifies how people accept and use information systems and technology. According to the model, consumers' behavioral intentions influence their acceptance of technology.

The results of the qualitative research conducted in the context of the Role of Information and Communication Technology at the intermediate level in District Sialkot, grounded in the TAM, revealed several key findings. The qualitative data analysis focused on understanding the perceptions and attitudes of teachers and students towards the use of ICT in education, and how these perceptions influence their behavioral intention and actual use of technology.

The findings revealed that teachers and students in District Sialkot perceived ICT as highly useful for enhancing the learning process. The ability of ICT to enhance student engagement,

enable interactive learning, and grant access to an extensive array of educational resources is correlated with its perceived usefulness. Additionally, the perceived ease of use of ICT was identified as a key factor influencing the behavioral intention of teachers and students to use technology in the classroom. Participants expressed that user-friendly ICT tools and platforms were more likely to be integral to their teaching and learning practices.

The interpretation of the findings about the TAM confirmed the model's applicability in the context of District Sialkot. The qualitative data provided evidence that the perceived usefulness and perceived ease of use of ICT significantly influenced the behavioral intention of teachers and students to use technology. This, in turn, was linked to the actual use of ICT in the classroom. The findings aligned with the core propositions of the TAM, highlighting the model's relevance in understanding the acceptance and use of ICT in educational settings.

Comparisons with findings from existing literature further supported the validity of the TAM in the context of ICT acceptance in education. Studies by Asghar et al. (2018) and Nisha et al. (2018) also found that the perceived usefulness and perceived ease of use of ICT significantly influenced users' behavioral intention to use technology in educational settings. These comparisons reinforced the consistency of the TAM in explaining the acceptance and use of ICT, not only in District Sialkot but also in broader educational contexts.

1. **Discussion**

5.1 ICT and Educational Outcomes

The exploration of the role and utilization of information and Communication Technology (ICT) in the educational landscape of Pakistan, particularly at the high school level, yields insightful revelations about both the progress made and the challenges faced in integrating these technologies into the educational framework. This analysis is enriched by the findings of Khan et al. (2011), who previously highlighted the scarcity of ICT infrastructure in schools, contrasting sharply with the current

scenario where significant advancements are evident.

The study underlines a notable development in the availability and functionality of ICT resources in high schools. It is reported that computer laboratories are well-equipped, with each lab housing 16 fully operational computers, thus reflecting a substantial commitment to integrating digital technologies in education. Furthermore, these laboratories boast of a robust internet infrastructure, characterized by direct DSL or V-Fone PTCL connections, ensuring that each computer has internet access. This setup not only facilitates the digital needs of the educational process but also aligns with the global standards of educational technology.

The use of these ICT facilities by teachers is both frequent and intensive, suggesting a positive inclination towards embracing digital tools in the educational process. The versatility of internet usage in these settings is highlighted by the diverse range of websites accessed for educational purposes, indicating an active engagement with the vast resources available online. This practice is instrumental in broadening the educational horizons of students and teachers alike, fostering a culture of inquiry and self-driven learning.

The Technology Acceptance Model (TAM), conceived by Davis, stands as a seminal theoretical framework for understanding and predicting how individuals accept and utilize information systems and technology. The core tenet of TAM is that a person's behavioral intention to use technology is a significant predictor of their actual technology usage. Perceived utility and perceived ease of use are the two criteria that have the biggest impact on this aim.

- Perceived Usefulness: TAM measures a person's belief that employing a specific system or technology will improve job performance or task completion. In the context of education, for instance, this would translate to the belief among teachers and students that using ICT tools would enhance the learning and teaching processes. If the technology is perceived as

useful in facilitating learning, improving grades, or making teaching more efficient, it is more likely to be accepted and integral into educational practices.

- Perceived ease of use refers to a person's belief that using a system or technology will be effortless. In educational settings, this relates to how user-friendly and accessible ICT tools are for both teachers and students. If the technology is perceived as easy to use, requiring minimal effort to learn and integrate into existing routines, its acceptance is likely to be higher.

The relevance of TAM in educational settings, particularly in examining the role of ICT at the intermediate level in districts like Sialkot, is substantial. The model offers a framework to assess how teachers and students perceive the usefulness and ease of use of ICT tools in their educational environment. By understanding these perceptions, educators and policymakers can tailor ICT integration strategies to increase acceptance and effective use, thereby enhancing educational outcomes.

5.2 Teacher Training and ICT Competency

Lowther et al. (2008) have emphasized the significance of three fundamental characteristics for enhancing the excellence of education and knowledge with the use of Information and Communication Technology (ICT): autonomy, capability, and creativity.

Autonomy in this context refers to the empowerment of students in directing their learning processes through ICT. This autonomy enhances their ability to work independently and collaboratively. Teachers play a role in facilitating this by delegating certain tasks to be completed either individually or in groups.

The integration of ICT in collaborative learning enables students to construct new knowledge based on their existing understanding, fostering a sense of confidence and a willingness to experiment and learn from errors. Serhan (2009) further supports this view by asserting that ICT promotes autonomy among educators, allowing them to craft their teaching materials and thus exert greater control over course content

compared to traditional classroom settings.

As students build confidence in their learning processes, the concept of capability enters the picture. They develop the ability to effectively and efficiently apply and transfer knowledge while engaging with new technology. For instance, in an ESL listening and speaking class, students might utilize an online audio dictionary to practice pronunciation. This task requires them not only to listen to and replicate native pronunciations but also to understand and use new vocabulary in context. The process involves choosing the appropriate browser, selecting the most suitable dictionary, and finding reliable software for voice recording. This comprehensive approach not only enhances students' technical skills but also expands their knowledge base.

Furthermore, the use of ICT can significantly boost students' creativity. They are encouraged to explore new multimedia tools and create content inspired by various media sources such as games, CDs, and television. The amalgamation of student autonomy, capability, and creativity facilitated by ICT can lead to substantial improvements in both the quality of teaching and the learning experience. This holistic approach to education leverages the potential of ICT to transform traditional learning paradigms, fostering a more dynamic and interactive educational environment.

The factors influencing the utilization of ICT in education can be categorized into external and internal elements, both of which are interconnected and significantly affect the level of ICT usage (Texci 2011a). Externally, several determinants impact the integration and efficacy of technology in educational settings. These encompass the obtainability and accessibility of technology, the allocation of time for instructional planning, the provision of technical and administrative support, curriculum constraints, the educational environment and culture, faculty workload, and the weight of preparing scholars for national assessments (Al-Ruz and Khasawneh 2011;nLin, Wang and Lin 2012; Tezci 2011). Predominant among these are challenges such as limited access to computers and software, constrained time for

lesson planning, and a lack of sufficient support systems (Chen, 2008).

Internally, factors related to educators play a crucial role in the integration of technology (Sang et al. 2011). These include educators' comprehension of ICT, conflicting beliefs regarding ICT application, attitudes towards technology integration, motivations, self-assurance, technological proficiency, willingness to employ ICT, and technological self-efficacy (Al-Ruz and Khasawneh 2011). Chen (2008) identified key issues within these interior issues: teachers often tool rules based on an incomplete or incorrect understanding of ICT and may resist allocating additional time for students to explore content independently through allocating due to conflicting beliefs or content coverage pressures. These issues suggest a discrepancy between teacher beliefs and their classroom practices, with competitive school culture and high-stakes assessments potentially discouraging technology integration.

In a specific study by Teo et al. (2008), the beliefs of Singaporean pre-service teachers about teaching and technology usage were examined quantitatively. Constructivist teaching principles were found to positively correlate with both constructivist ($r = 0.59$, $p < 0.01$) and traditional ($r = 0.50$, $p < 0.01$) use of technology. In contrast, traditional teaching views were found to be adversely linked with the use of constructivist technology. This indicates a gap in the preparation of these pre-service teachers for facilitating students' knowledge construction. Despite technology's potential to enhance interactive, self-directed learning and critical thinking, its integration alone does not guarantee improved learning outcomes. The combination of constructivist learning approaches with technology is vital, as it aids learners in actively engaging with and organizing information through internal cognitive processes. Therefore, ICT's effectiveness in the classrooms hinges on educators who are not only versed in the technology but also skilled in employing it to achieve educational objectives (Koc 2005)

5.3 Barrier to Effective ICT Implementation

However, the integration of ICT in education is not without its challenges. A primary obstacle identified is the recurrent issue of electricity outages, which significantly hampers the consistent use of computers as a medium for enhancing educational processes remains high. This enthusiasm is mirrored in the curriculum, with computer science being offered as a secondary school subject reflecting the growing recognition of ICT's importance in the educational landscape.

While the benefits of Information and Communication Technology (ICT) in educational contexts are well-documented, various challenges from a student's perspective persist, as highlighted in the research of Frederick, Schweizer, and Lowe (2006). They identify key issues such as student mobility, the unique needs of special education students, and the anxiety associated with standardized testing as significant obstacles to the effective use of ICT. To mitigate these challenges, more immersive learning approaches, such as reliable group and problem-based activities, coupled with robust learning support, have been suggested by Whelen (2008) as effective solutions.

Furthermore, Whelan (2008) has pinpointed additional barriers, including students' inadequate technical skills which hinder their full engagement with ICT resources, a scarcity of academic advisors, delayed feedback from instructors, and diminished interactions with peers and educators. To address these issues, the author proposes several strategies. These include enhanced induction, orientation, and training programs for students to improve their ICT competence, greater emphasis on accessible and responsive instruction; and the broader use of digital tools like podcasting and online conferences to foster communication and learning.

Overall, the successful integration of ICT in educational settings hinges on a multifaceted approach encompassing capacity building, curriculum innovation, infrastructure enhancement, policy development, and governmental backing. This comprehensive strategy aims to reduce the barriers faced by

students and augment the efficacy of ICT in classrooms. Additionally, Castro Sanchez and Aleman (2011) advocate for the necessity of students acquiring specific technical skills, which are instrumental in navigating and benefiting from ICT-enabled educational environments.

Challenges to the effective integration of technology in educational settings from the perspective of educators are multifaceted and significant. These include:

1. Educators often face the issue of unclear objectives for the use of ICT in educational institutions (Al-Bataineh et al., 2008).

2. There is a notable lack of cooperative efforts and pedagogical backing, along with limited experience among teachers working together (Ertmer and Otternbreit-Leftwich, (2010)

3. Teachers frequently encounter difficulties in dedicating adequate time to master new technologies or to integrate them effectively within the limited duration of class periods (Almekhlafi and Almeqdadi, 2010)

4. The challenge of efficiently organizing and managing teaching resources is a significant concern (Frederick, Schweizer, and Lowe, (2006)

5. Many educators exhibit low competence in software usage and tend to stick to traditional methods of teaching (Goktas, Yildirim, and Yildirim, 2099)

6. There is a widespread lack of awareness and experience regarding the use of ICT in educational contexts (Honan, 2008)

7. Educators often struggle with integrating technological tools with their pedagogical content knowledge to enhance student learning (Hutchison and Reinking, 2011)

8. There is a tendency to focus performance more on imparting technical skills rather than on the core subject matter (Lin, 2007)

9. The imperative to improve performance in national examinations often overshadows the potential of ICT integration (Liu and Szabo, 2009).

10. There is often insufficient acknowledgement and motivation for teachers who effectively use ICT (Tezci, 2011)

11. The absence of ongoing training programs for teachers on the ICT usage gap (Yildirim, 2007)

12. Technical issues during classroom sessions pose a frequent obstacle (Yildirim, 2007)

13. Managing large class sizes while integrating technology is a significant hurdle (Tezci, 2011)

14. Teachers often face a deficiency of motivation, technical assistance, and fiscal backing (Liu and Szabo, 2009)

15. There is often scepticism about the actual advantages of employing ICT in educational settings (Yildirim, 2007)

16. There is a deficiency in concrete and specific plans for how technology incorporation can enhance student learning outcomes (Al-Bataineh et al., 2008)

5.4 ICT and Skill Development

Watts-Taffe et al. (2003) have highlighted the pivotal role of teacher facilitators in the integration of technology through ICT. They underscore that with the provision of support, encouragement, and the necessary technological infrastructure by educational institutions, teachers can more readily develop ICT-enhanced classes. These teachers are tasked with transforming traditional course formats, devising new assignments, and coordinating the use of computer labs, often in collaboration with technology learning specialists or assistance.

Echoing these sentiments, Reid (2002) points out that ICT not only provides students with additional opportunities to delve deeper into course content, beyond its basic mechanics but also enables a more profound comprehension of underlying concepts. Furthermore, the adoption of ICT in education alters the traditional dynamics of the teaching and learning relationship. Reid's research indicates a notable shift wherein students occasionally take on the role of the instructor in matters of information

technology. This reversal of roles not only augments the students' confidence, especially when they assist teachers with technical challenges in the classroom but also necessitates a departure from the conventional teacher-centered approach.

In this new paradigm, educators are encouraged to be more innovative in tailoring and modifying their teaching materials to suit the ICT-enabled environment. While the integration of ICT in education presents numerous advantages, it is not without its challenges. Subsequent sections of the literature identify and categorise these challenges into four main areas: student perspectives, teacher perspectives, administrative viewpoints, and issues related to ICT infrastructure. Additionally, a range of strategies for overcoming these barriers are discussed, offering a comprehensive understanding of both the potential and the limitations of ICT in educational settings. This balanced view acknowledges the transformative impact of ICT in educational settings while also addressing the practical challenges that need to be surmounted for its effective implementation.

Technology's role in education should extend beyond the mere augmentation of conventional teaching methodologies (Tezci, 2011). Tezci emphasises that educators need to not only understand the utility of technology in enhancing traditional instructional methods and boosting productivity but also adopt a learner-centric approach in integrating ICT into classroom practices to foster student learning. This involves leveraging ICT creatively and productively to devise engaging activities and more impactful lessons, as suggested by Birch and Irvine (2009) and Honan (2008). Consequently, Castro Sanchez and Aleman (2011) advocate for educators to maintain an open-minded approach towards ICT integration in educational settings, underscoring the importance of embracing novel teaching strategies that complement technological tools.

Nonetheless, Yildirim (2007) observed a tendency among teachers to utilise ICT predominantly for creating handouts and assessments rather than to encourage critical reasoning. Echoing this, Palak and Walls (2009)

noted that technology is often employed to reinforce existing instructional methods rather than to promote a student-centric learning environment. This could be attributed to the death of exemplar models showcasing the application of technology in learning enhancement and constraints related to issues like class size and student capabilities. Additionally, Brush, Glazewski, and Hew (2008) identified a gap in pre-service teacher training, which often fails to adequately equip future educators with the necessary ICT competencies for technology-driven instruction and does not effectively demonstrate how to integrate technology within a curriculum framework.

Therefore, as Supon and Ruffini (2009) recommend, there is a critical need for enhanced training in pre-service educational programmes, ensuring that ICT skills are not only taught but also practically applied in classroom settings for effective technology integration. To assist educators in overcoming these challenges, Chen (2008) proposes that ICT research should not only focus on educational theories but also provide tangible, documented instances of how educators can achieve meaningful and successful technology integration in alignment with their instructional objectives and requirements.

5.5 Role of Government and Policy Frameworks

In response to the challenges posed by power outages, the government of Pakistan and the provisional authorities in Punjab have taken proactive measures. The introduction of interrupted power supply (UPS) systems in schools is a commendable step towards mitigating the disruptions caused by electricity failures. In response to the challenges posed by power outages, the government of Pakistan and the While this solution does not entirely resolve the issues, it represents a significant stride towards ensuring continuity in the use of ICT resources.

Despite these advancements, the study also uncovers a gap in the accessibility of ICT education. It is observed that general students,

who are not enrolled in specific computer science courses, have limited access to computer classes and ICT learning opportunities. These limitations point towards a need for a more inclusive approach to ICT education, ensuring that all students, irrespective of their chosen subjects, have the opportunity to develop digital literacy and competencies.

The involvement of government and policy frameworks in education, particularly with the use of information and communication technology (ICT), is critical for changing the educational environment and preparing students for the challenges of the twenty-first century. The World Bank's SABRE ICT Framework Paper for Policy Analysis offers a comprehensive methodology to assist policymakers in analyzing and assessing their educational ICT policies. This framework is intended to help and inspire educational policymakers as they develop, review, and assess critical policies connected to the use of information and communication technologies, particularly in the formal education sector at the primary and secondary (K–12) levels (Michael, 2016).

Additionally, UNESCO has emphasised the importance of ICT in curriculum and assessment, highlighting the need to shift learning from information acquisition to knowledge and skills acquisition, which is in line with the goals set in various national policies (Robert, 2011). Furthermore, research on policy implementation and evaluation studies of ICT in schools has provided valuable lessons for governments in effectively implementing ICT policies in the education sector (Younie, 2006).

Governments have an important role in increasing ICT access and use among small and medium-sized enterprises (SMEs). Governments play critical roles in providing basic ICT skills in primary and secondary schooling, as well as in establishing a framework to encourage ICT skill formation at higher levels, vocational training, and ongoing lifelong learning (APDIP, 2007). Furthermore, the function of education in regulating the impact of ICT on governance has been investigated, notably in African countries. The study emphasises the role of education in determining the rate of ICT adoption and its impact on institutional transparency and the rule of law (Wirajing, 2023).

The Pakistani government has acknowledged the significance of information and communication technology (ICT) in education and has implemented policies and strategies to enhance its use (Zafar, 2011). These include providing ICT access in higher schools, enhancing teaching quality, and building capacity in the education department. The Ministry of Federal Education and Professional Training has also facilitated technology interventions to improve teacher and student content knowledge. However, there are still significant gaps in ICT demand, supply, and use in higher education. An effective Higher Education System (HES) ICT policy could significantly improve the Pakistani knowledge-based economy (National Educational Policy Framework, 2018).

Conclusion

The study on "The Role of Information and Communication Technology (ICT) at the Intermediate Level in District Sialkot, grounded in the Technical Acceptance Model (TAM) developed by Davis, provides valuable insights into the acceptance and use of ICT in educational settings. The study's findings highlight the importance of perceived usefulness and perceived ease of use in influencing the behavioural intention and actual use of technology by teachers and students. The study's use of the TAM provides a robust theoretical framework for understanding the acceptance and use of ICT in educational settings. The literature review on ICT in education and its relevance to the context of District Sialkot revealed that ICT plays an indispensable role in the socio-economic development of developing countries such as Pakistan.

The literature review emphasised the potential of ICT tools and technologies to improve government and social development, with a focus on low-cost engineering solutions. The

study findings align with existing literature on ICT adoption and the Technology Acceptance Model (TAM), highlighting the relevance of the model in understanding the acceptance and use of ICT in education.

The qualitative research undertaken for the study gave a thorough grasp of instructors' and students' opinions and attitudes about the usage of ICT in education. The findings revealed that instructors and students in District Sialkot saw ICT as extremely effective for increasing teaching and learning engagement, facilitating interactive learning, and providing access to a diverse range of educational resources. The study's findings verified the Technology Acceptance Model (TAM), which states that perceived utility and simplicity of use of ICT have a substantial influence on teachers' and students' behavioral intentions to utilize technology.

The study, The Role of Information and Communication Technology at the Intermediate Level in District Sialkot, is based on the Technology Acceptance Model (TAM) and gives useful insights on ICT acceptance and use in educational settings. However, the study's small sample size, dependence on self-reported data, and narrow emphasis on a single region may restrict its generalizability and transferability.

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