

## **Exploring the school stakeholders' understanding and knowledge about information and communication technology and its application in improving management functions: a comparative study in the urban context**

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### **ABSTRACT**

This research focused on school stakeholders' understanding and knowledge of information and communication technology (ICT) utilization in dealing with management responsibilities (MFs) in Pakistan. Stakeholder perceptions of ICT usage in management and the solutions employed to address the barriers encountered in attaining management functions to enhance effectiveness were explored in a qualitative case study of two urban schools. The data revealed that private secondary schools deploy various types of technological devices, in the performance of their duties. The management and finance staff envision improving their present ICT infrastructure, envisaging the positive influence of ICT usage on their work, for ease of data storage and retrieval with just a few clicks. ICT tools like laptops, CCTV cameras, and biometric devices brought a substantial change in the accomplishment of management responsibilities, such as planning, reporting, communication, and maintaining school discipline. However, challenges like technology failure have a significant influence on the work performance and management efficiency of the senior stakeholders. Stakeholders have used various methods to overcome issues, with the principals' ultimate aim to enhance the capacity of self-sufficient persons through capacity-building sessions. The solutions employed to address the difficulties were helpful. The study revealed that ICT has changed the traditions of managerial practices in Pakistan and raised school standards.

**Keywords:** *Information and Communication Technology; Management Functions; ICT utilization; ICT integration; Barriers; Strategies*

### **INTRODUCTION**

#### **Historical overview of Information and Communication Technologies (ICTs) and Management Functions**

Since the world has progressively revolutionized with the emergence of information technology (IT), the practice of integration and utilization of IT devices has increased in every aspect of living, including industry, engineering, banking, and trade (Cereci, 2018; Oluoch & Osida, 2014). Computers became the primary medium in the early 1990s for stakeholder use of ICT tools to accomplish their tasks. Major improvements in the computing sector which occurred later allowed for computers to become widely used in school management in Pakistan (National Education Policy, 2017).

ICT is a broad term that refers to computer systems and networks and is derived from the phenomenon of information technology (Qureshi & Abro, 2016). It is a combination of computers, application software, services, and telecommunication equipment, that deals with any technological device that electronically saves, sends, receives data and allow users to execute various management duties, including observing, staffing, planning, scheduling, finance, administering and regulating daily school operations (Munir & Khan, 2015; Oyier et al., 2015). Administrative duties like official correspondence have been facilitated by different technological gadgets (Ali, Riaz, & Wattoo, 2018). The technological tools aided by the Internet ([https, www](https://www)), include printers, laptops,

projectors, computer-assisted databases, photocopy machines and computers, cellophanes, computing technologies, radio, landlines, and scanners, have become the commonly used ICT resources (Stanley, Doucouliagos & Steel, 2018). The application software includes information management systems, computerized enrollment systems, videoconferencing, spreadsheets, databases, instant mailing web applications, multimedia, android mobile apps, and office suite software extensively used for correspondence, reporting, and decision making and to accomplish other related tasks.

ICT has risen in importance in the education sector, particularly among private schools. School administrations have focused on using technological tools to attain their work as it has innovated the mode of administration (Pohekar, 2018). ICT has been acknowledged as a great catalyst for growth, and empowerment, enhancing accountability in the management and educational effectiveness (Salam et al., 2017). According to the literature, ICT use has a valuable influence on the operation of administrative functions. For example, Palagolla & Wickramarachchi (2019) noted that ICT utilization has a direct link to performance factors. This notion brought a major shift in the way school stakeholders accomplish their routine tasks and it has a significant influence on job competence. However, the study has shown that managers work hard to manage technology appropriately to get the utmost potential and ICT leadership is seen as an essential component of effective ICT infrastructure management.

### **Management**

Management is the art of adequately leading the organization. However, literature provides varied understandings and meanings. According to Drucker (1986) management is an art, a discipline, and a work that is done in collaboration with or through the activities of others and “managers are the persons who perform the functions” (pp. 10). Management is planning, coordinating, directing, and regulating the organization’s operations. Management is a maintenance activity that entails the flawless execution of administrative and managerial duties (Bush, 2007; Cuban, 1988; Dimmock, 2013). Drucker (2012) define management as “...a specific function of management to organize the resources of the organization” (pp.39). The management process is known as an activity of incorporation and development.

### **Educational Management**

The three main pillars of school management are administration, finance, and human resources, which work together to keep the school system running smoothly. According to Bush (2008) educational management is a discipline that deals with the operation of management functions such as planning, organization, communication, reporting, documentation, and implementation. It is primarily focused on school improvement goals. In theory, the five functional domains of school management are planning, organizing, directing, coordinating, and controlling. Management refers to the methods used by institutions to carry out their day-to-day operations. The father of management (Fayol, 1841–1925) and other scholars (Allison, 1980) described the management functions as planning, staffing, directing, reporting, command, and budgeting.

Management encompasses all areas of planning, organizing, recruiting, implementing, directing, evaluating, monitoring, and motivating (Okonkwo, Kalu Sunday & Okonkwo, 2018). Thus, it deals with school financial operations, administration, communication, budgeting, record keeping, accounting, maintenance, recruitment, command and control, all of which are aligned to meet the organizations’ objectives. Drucker, (2012) stated that “the first task of management is to define what results and performance are in the organization” (pp.39). He further elaborated that the traditional concept of management is being based on “command and control” (pp.30), however the notion of conventional management has shifted to the modern modes of administration and organizational structures where educational technologist play a great role in resource management

(Huang, Spector & Yang, 2019). The true means of 21<sup>st</sup> century management is identified as technology.

School management is the central schema of schools. Effective management leads schools to progress steadily (Dimmock, 2013). Technological advancements in the twenty-first century have altered traditional management practices in Pakistan (Fetaji et al., 2018b). The use of ICT tools and technology has now become the need of the school systems for the active operation of schools (Chandio et al., 2019) and it is implemented in most educational institutions across the country. ICT technologies has enabled school administrators to keep track of school activities, assess them, and follow the timetable. The secondary school management has worked hard to find new ways to enhance their effectiveness at their work as the school managers oversee ensuring that schools run well (Agih, 2015), and they are eager to apply new management approaches to increase efficiency (Claude, Hansson & Ben, 2019). Modern time ICT adoption and utilization has been posited as the only solution that can enhance capability (Shah & Atta, 2014).

Meanwhile, ICT usage in school management has become common in most private schools (Oboegbulem & Ugwu, 2013; Oluoch & Osida, 2014) because it has improved educational effectiveness (Fetaji et al., 2018b). However, stakeholders are confused about the norms of proper ICT utilization, especially when there are adverse effects on their work (Jogezai, Ismail & Ahmed 2016). There is a huge gap in the understanding and knowledge of users regarding appropriate ICT usage and researchers have tried to fill this gap by exploring similar topics (Chandio et al., 2019). However, there is need for an in-depth investigation to find the practices of appropriate ICT usage. Consequently, this research aimed to examine the understanding of school stakeholders in Pakistan regarding ICT utilization in management functions.

The following questions guided the research:

### **Research Questions**

- 1) What does the school management understand about the use of ICT in making school management functions efficient in the context of Karachi, Pakistan?

The study also focused on subsidiary questions as follows:

- 1) What ICT infrastructure is available and utilized in the schools to support school management tasks?
- 2) What are some frequent problems that stakeholders experience while attaining management functions, and how do these challenges affect the effective use of ICT and the efficiency of stakeholders' work?
- 3) What measures are being used by school stakeholders to address these issues?

## **LITERATURE REVIEW**

### **A Conceptual Review of ICT's Use in Educational Management Functions**

The use of Information technology (IT) is a recent phenomenon in developing countries (Ali, Riaz, and Wattoo, 2018) for enhancement of school management efficiency (Beqiri & Tahiri, 2014). The administration and management teams have integrated the advanced technology and are using it to handle operations where working modes have changed the organizational structure (Claude, Hansson & Ben, 2019). It has strengthened school-wide management and system-wide organization (Van Niekerk, & Blignaut, 2014; Wallet & Melgar, 2014) and learning, and facilitated accomplishment of the tasks and improved the effectiveness of managers and decision-makers.

Consequently, there is significant shift in the perspectives of school principals on the use of ICT in educational services (Fetaji et al., 2018b). Head teachers are keen to assimilate ICTs into education (Ramesh & Dibaba, 2017). According to national literature, ICT adoption became a trend in private sector educational institutions, particularly in secondary schools in Pakistan (Tunio, Rashdi, & Abro 2014). It has supported educational managers and principals in supervision, administration of student affairs, bringing coordination and collaboration amongst the stakeholders, monitoring the progress, financial management, appropriate allocation of human resources, and execution of other school activities (Makewa et al., 2013). Thus, it has strengthened management and brought sustainable development to schools (Juma, Raihan & Clement, 2016). Technology has doubled managers' participation and boosted their output, making it a truly twenty-first-century management approach.

### **Administrative functions**

ICT plays a vital role in the administration of the secondary school. It is viewed as a tool for administration and collaboration (Pohekar, 2018). Administrators have deployed various ICT tools to effectively manage and administer schools (Onyije & Opara, 2014). South Asia has seen a progressive increase in using ICT in managerial tasks. It has a significant impact on users since it motivates stakeholders to participate actively in their learning (Juma, Raihan and Clement, 2016). Many studies, such as those conducted by Oyedemi (2015), found that information management, audiovisual communicate, and reporting all benefited from ICT, and technology has a significant influence on administrative functions such as record keeping (Ashraf & Gajani, 2019; Egoeze et al., 2018).

### **Communication**

Instant communication is made possible by configuring technological devices such as software and web applications including instant messaging, and services (Google Drive or One Drive), add-ins (Team Viewer, Skype), android mobile apps (SMS, WhatsApp, Viber), and discussion boards. For example, Juma, Raihan, & Clement (2016) found that ICT increased administrator efficiency by bringing improvements in communication, such as synchronous and asynchronous data transformation, made possible digitally and electronically. Computers and the Internet have facilitated many teacher coordinators in far flung areas at the same time (Tahir et al., 2015).

### **Data processing**

ICT has supported the acquisition of organizational responsibilities, such as documentation and timetabling (Tagalou et al., 2013). It has assisted administrative and financial personnel with efficient processing, analysis, and sharing data, which has improved employee collaboration and reduced workload. Management Information Systems (MIS) have improved management duties by raising the quality of data processing and dissemination, communication, precise reporting, enhancing the accuracy in records, and empowering principals in decision making, recruitment, execution and planning (Njoku, 2013). According to the researchers, sophisticated management systems with advanced data processing, graphical and visual depiction of development figures, improved stakeholders learning and knowledge, effective management, and strong monitoring mechanisms that aligned with the efforts of managers to enhance their institutions' notoriety (Fetaji et al., 2018a; Jin, 2014).

### **Financial Management**

Financial matters are hard to manage. It is necessary to install an ICT automated transactional environment in finance. Muema (2015) observed that ICTs helped finance employees in Tanzania

to accomplish financial tasks like accountancy, fee processing, brought accuracy, lessened the embezzlement of funds, and reduced redundant data. It has aided schools in bringing interoperability, integrity, and checks and balances to financial activities including student fees, budgeting, and resource management (Oluoch, 2016). Oyier et al., (2015) provided data on ICT use in financial management from a study conducted in Nairobi, Kenya, which revealed that ICT upgraded the finance and administration functions. They found that 62 percent of schools had computerized accounts, 71 percent had payroll, and 53 percent of schools used ICT to create budget-generating and budget-allocating systems, which assisted the administration in the maintenance of about 68 percent of automated stores, and 56 percent of student and staff records maintained and managed in different databases.

### **The use of information and communication technologies (ICTs) and educational management functions in Pakistan**

Technology changed the world, particularly the industrialized countries (the United States, the United Kingdom, and Japan), where the conventional workplace structure extended to a digital one dramatically. It has introduced various technological gadgets (tablets, scanners, and printers) with advanced features for the institution (Temboge & Sani, 2018). However, there is a huge digital divide between developed and developing nations, although ICT usage has been expanding in third-world nations such as Pakistan (Adil, Masood & Ahmed, 2013).

According to the National Education Policy (2017b), personal computers first appeared in the Pakistani market in the mid-1980s, when the United Nations Development Programme (UNDP) sought to implement a PC-based Educational Management Information System (EMIS). According to the Pakistan ICT Indicators Survey (2014) the availability and access to ICT tools in the education sector were low, and the learner-to-computer access ratio was observed at 19.93. The provision of ICT facilities has not been taken seriously; most educational institutions restricted access to technological gadgets; only 2% of televisions, 42% of phones, and 10% of the Internet were used for educational purposes. Barely half of the population had access to ICT resources in megacities such as Karachi, Lahore, and Islamabad at the time of the survey (Shaikh & Khoja, 2011). Pakistan is rated 127<sup>th</sup> among the 140 South Asian nations in terms of ICT growth, according to the Annual Plan (2019-2020), and the digital skill level of the technology users of Pakistan is placed at the 75<sup>th</sup> position indicating that the users across the country have improved their digital skills.

Meanwhile, ICT usage drastically increased from 2002 to 2014 in education (Pakistan ICT Indicators Survey, 2014). According to Munir & Khan (2015), the Internet and computer usage scales raised significantly over the period, and about 53% of instructors had access to desktop computers. The Public Sector Development Program (PSDP) (2018-2019) granted 6,535 million rupees to the ICT industry. Pakistan planned to strengthen the IT sector by installing advanced IT infrastructure and training human resources in IT. In addition, according to the 2017-2025 Pakistan Vision, Pakistan Higher Education Commission Vision (PHEC) has aimed to develop the education sector by improving competency. Until 2025, the focus will be on improving institutional ICT infrastructure through programs like distribution of computers, digitized material procurement (Wi-Fi internet, Data Storage), and solutions. As a result, Pakistan is preparing to enter the next stage of ICT development. The users in Pakistan have already affirmed that ICT helped them attain their routine activities effectively. For instance, a descriptive study conducted in a secondary school in district Pak pattan by Ali, Riaz, & Wattoo (2018) showed that 80% of students had enhanced communication skills, 73% developed social relationships, and the management staff considered it a valuable tool to furnish themselves. The demand for ICT is expanding, and it has now become the most important component of Pakistan's educational system (Ashraf & Gajani, 2019). Moreover, the users across the country believed that ICT utilization is beneficial that enhanced their abilities. It facilitates the smooth fulfillment of management and administrative obligations. However, ICT comes with a host of risks if it is deployed or used poorly.

### **The Barriers and Challenges**

On the one hand, fast technological improvements comforted school stakeholders. On the other hand, many school leaders around the globe have had difficulty gaining access to ICT tools and implementing them in secondary school management.

The lack of resources such as insufficient equipment, skills and knowledge, training opportunities, administrative support, and awareness of ICT usage are some of the most common barriers faced by school stakeholders across the world (Munir & Khan, 2015). Thus, the user's efficiency and the quality of their job suffer. Educational institutions have confronted several challenges in ICT implementation, including ineffective systems with significant technical faults, non-technical staff with limited knowledge, ICT skills, and ineffective head teachers (Baba & Odiba, 2015). The principals' attitude, leadership and decision-making skills, perceptions, and ICT capacity have also hindered effective ICT utilization (Semerci & Aydin, 2018).

Similarly, school stakeholders in Pakistan face several problems that lessen work effectiveness. Tunio, Rashdi & Abro (2014) discovered that improper ICT integration is the most substantial barrier to proper ICT usage at a secondary school in Hyderabad. Many educational organizations have also suffered due to insufficient and inappropriate addition of ICT equipment (Qureshi & Abro, 2016; Van Niekerk & Blignaut, 2014). The most prevalent problems are a lack of resources, ICT policy, procedures for acceptable ICT implementation and usage, electricity, funds, limited Internet access, as well as incompetent ICT leaders and management attitude (Eremie & Agi, 2020). In other cases, the stakeholders were frustrated because of the failure of ICT equipment, computing anxiety, lack of technical support, skills and knowledge, training, administrative support, and lack of awareness (Tagalou et al., 2013). The schools have been unable to offer the requisite effectiveness due to poor organization of educational infrastructure and quality of education (Okonkwo, Kalu Sunday & Okonkwo, 2018).

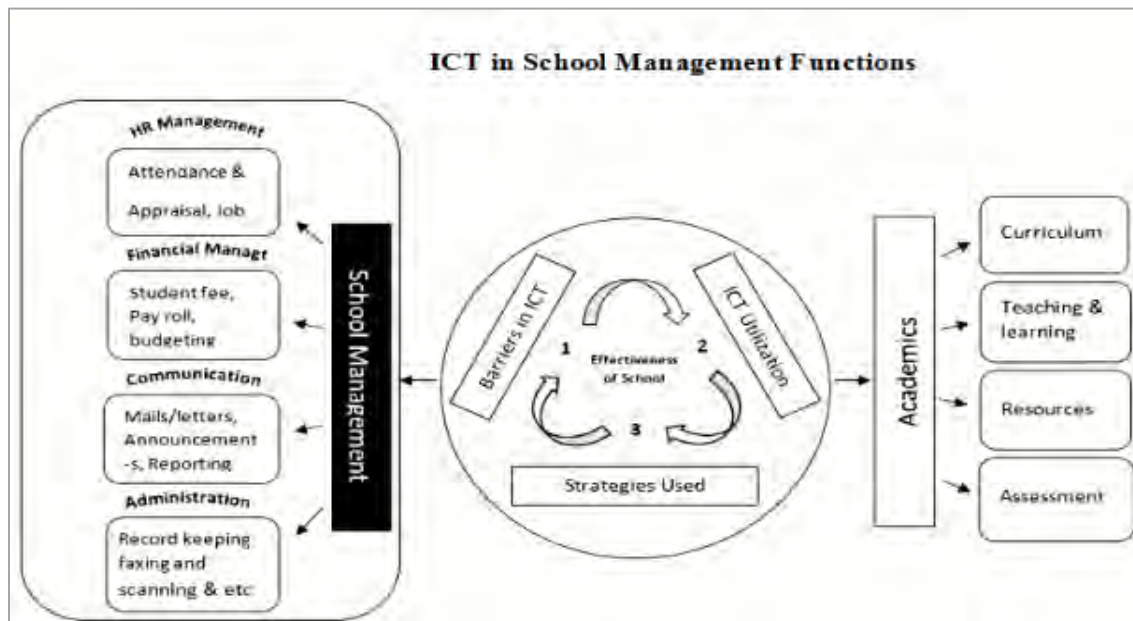
### **The Effective Management of ICT**

Earlier studies have noted the above-stated challenges as difficult to overcome and manage (Adu & Olatundun, 2013). The literature suggests that effective strategies would improve ICT application and help to eliminate hurdles in successful ICT implementation. However, to turn problems into rewards, it is necessary to have self-sufficient leadership, administrative efficacy, and remarkable decision-making competence (Okon, Ekaette & Ameh, 2015). According to the literature, school stakeholders have sought government subsidies, involved parents in purchasing ICT devices, offered professional development workshops, and improved stakeholder cooperation and collaboration (Oluoch, 2016).

However, a study conducted in Jamshoro, Pakistan by Qureshi and Abro (2016) found that ICT was not used as effectively as it could have been in administration and management due to a lack of relevant resources, like management information systems with training and monitoring mechanisms. The advancements in technology and the intricacy of hardware and software, have placed school stakeholders in a rough position, and the ICT-literate leaders are in demand to address the issues (Bladergroen & Chigona, 2018; Oyedemi, 2015). It has been recommended that technical assistance be provided to raise managerial efficiency (Qadir & Hameed, 2018). An ICT awareness campaign, workshops, training programs, seminars, and conferences have been recommended to raise ICT awareness regarding ICT adaptation, implementation, and application (Kyakulumbye, Olobo & Kisenyi, 2012), while Jomezai, Ismail & Baloch (2018) recommended the provision of teacher capacity-building platforms to impart ICT skills. Further, the inclusion of ICT as part of the strategic plan has been proposed for educational institutions, and a clear vision and strategy or policy articulated for ICT adoption and utilization (Njoroge, Ngugi & Kinzi, 2017).

## Conceptual map

The literature review and the empirical data have framed the conceptual map for this study. It is focused on ICT usage in management functions administration, management, finance, and human resource (HR). The concept map shown in Figure 1 illustrates.



**Figure 1:** The conceptual framework of this study

## RESEARCH DESIGN AND METHODOLOGY

### The maturity model - Theoretical framework

The Maturity Model serves as guide for the study. It summarizes the study question and presents a comprehensive picture of ICTs in school administration. The *Maturity Model ICT in School Education* (ICTE-MM) is an ICT-based and capability-driven approach to evaluate ICT in education, enhance capacities and help ensure the availability of ICT resources (Solar, Sabattin & Parada, 2013). It was developed in 2006, based on the Capability Maturity Model Integration (CMMI). Educational Management, Infrastructure, Administrators, Teachers, and Students are the five leverage domains identified and elaborated thoroughly. This model was selected as it examines ICT management best practices and offers a criterion for evaluating ICT use in educational organizations.

The goal of this study is to obtain insight into how school stakeholders perceive ICT and how it may improve school management, and is largely exploratory, as it deals with the participants' understanding of ICT utilization and lived experiences. This exploratory study utilized the qualitative method and is based on the principle that the "...purpose of qualitative research is to achieve an understanding of how people make sense out of their lives, delineate the process of meaning-making, and describe how people interpret what they experience" (Merriam & Tisdell, 2016, p.29). Thus, there was a need to investigate pupils' experiences in a particular context, and an exploratory qualitative case study was conducted. The philosophical stance of the research lies within the interpretivist paradigm. Interpretivists think that reality is discovered by immersing oneself in the

environment of individuals who are living and experiencing an event through their various creative thoughts and views (Beaudry & Miller, 2016; Creswell & Poth, 2016).

### **The Case Study Method**

The goal of this study, which used the qualitative exploratory technique, is aimed at gaining a deeper insight and extract knowledge of the phenomenon within the context of its complexity. Based on the research goal, the nature of the study, research questions, and the conceptual framework generated from the literature review, this study used the case study approach at two private secondary schools in Karachi, Pakistan for comparisons in terms of the similarities and differences of both situations. The research is situated in the city areas to complement knowledge of ICT automated managerial platforms, stakeholders' practices of ICT utilization, and its consequences in the autonomous territory of Gilgit-Baltistan, which is administered by Pakistan. It is expected that the findings of this study will assist all school stakeholders and higher management to bring innovation in ICT integration and usage, thus helping to revise the current practices of their ICT application and adopt new ones.

### **The sample and sampling procedure**

#### **Sampling**

This study used purposive sampling to identify the population deemed most informed about the research problem. Creswell (2009) noted that “the purposeful sampling is used so that individuals are selected because they have experienced the central phenomenon” (p.217). To be included in the sample, an ICT-automated school management environment in the workplace had to be in operation for at least one year and ICT utilization in management functions. Two secondary-level schools that met the criterion were chosen from Karachi, Pakistan. The first campus was a non-governmental organization (NGO) school system, and the second school was community-based. The rationale for examining multiple case studies was to collect enough data to ascertain similarities and differences.

#### **The Participants**

The higher management-level staff were the target group for this study. A total of eight participants were selected, including the principal, administrator, finance officer, IT officer, and teachers. Participants were required have one year of experience in ICT utilization for functions like administrative, financial, and HR-related tasks and activities. Later, permission to explore participation of members of the human resource department was forbidden because of the security and confidentiality of the resources.

#### **The Data Collection Methods and Tools**

The case study employed different sources of evidence (Yin, 2014) “to shore up the internal validity and credibility of the study” (Merriam & Tisdell, 2016, p.26) known as triangulation. While documents, artifacts, interviews, and observation are typical sources of data collection (Creswell, 2014) semi-structured interviews, focus group discussions and observations, and were used to investigate the research problem. It was intended to conduct document analysis, but the school principal prohibited document analysis in both schools because of the confidentiality of official records.



## FINDINGS

### Case 1 – A Non-Governmental Organization (NGO) School

**The perceptions and knowledge of school stakeholders regarding the use of information, communication, and technology (ICT) in management functions:** The findings indicate that the participants have a general idea or perception regarding ICT usage in management. They have different views on how technology should be used in attaining managerial and administrative functions. Most stakeholders mentioned ICT usage in their daily activities at school, its benefits, and its obstacles, while some gave a broad overview like ICT in education. However, there were two main perceptions regarding ICT. The first is ICT's use in managerial functions, and the second is its use in academics. ICT has high importance among senior management and most of the participants saw ICT as a valuable asset and prefer to use it to attain their job duties. They stated that ICT had a significant impact on their job performance. It is considered a change agent since it has resulted in a positive impact on the school administration.

**ICT tools integration and accessibility:** The study revealed that school management has a significant emphasis on ICT usage and integration. The stakeholders were observed doing their duties and using ICT tools including computers, multimedia, printer, and others. The participants elaborated that technology is integrated into the school and the level of integration was intermediate. One teacher noted during the focus group discussion,

*"I can say it is intermediate level because it is not entirely basic, it is not at a higher level, and it is in the medial or intermediate".*

The Finance officer backed up the assertion

*"we integrate the ICT tools at an intermediate level," he continued, "and that is enough; our requirement met".*

The principal was delighted to be a part of the organization where ICT has not only high importance but also integrated advanced technology. The school, particularly the management, administration, and finance departments have been provided with a range of ICT tools that allow all departments to collaborate online and execute tasks simultaneously. For example, the IT officer demonstrated several switches they integrated to create an internal network for sharing data and resources, by connecting the computers through coaxial cables and configured a high-bandwidth Internet and file and print server.

**Management functions and effects of ICTs' utilization:** According to the findings, management has built an ICT-driven culture. Observations indicate that the school management has deployed ICT tools in each department appropriately. Stakeholders have access to the ICT technologies to perform managerial duties and all ICT tools provided were operational, and participants were using PCs, printers, and scanners. The Internet was the primary medium to receive and disseminate data. The stakeholders employed ICT to conduct various management tasks. The principal noted,

*"The ICT enables me to make better-informed judgments, share, organize, monitor, and regulate school activities and most importantly it connects us with the world,"*

**The administrative functions:** The following administrative functions are being performed with ease through ICTs:

*Recordkeeping.* Management provided an advanced data management system to the administration department to help administrators save, assemble, and analyze large amounts of data. Administrative employees were aware of a variety of databases used to hold student and instructor records. The Administrative Officer shared,

*"...in our school, the principal has installed one software named as, 'Fee Manager' to manage fee records, another for result preparation (Student Information Management System)... 'Microsoft Word, Excel, and Outlook' assisted me in completing additional chores."*

Observation also indicated evidence of the integration of data management software which enabled finance and administrators to execute error-free accounting and store student information. The Administrative Officer added,

*"We use the SIMS on an intranet to store and maintain student admission and evaluation information"*

**Financial management:** The stakeholders declared that the finance department plays a vital role in successful planning, reporting, documentation, and decision making. The stakeholders maintain student data in data management software, which improved the finance and management capacity to execute error-free accounting. The finance staff executes complex financial functions in database management systems. As the finance officer shared,

*"..the latest ICT integration provides them with more opportunities to carry out complex financial tasks in multiple ways in a more innovative way".*

*Record keeping.* With the support of various technologies, the financial team compiled, and stored data and ICT use assisted with the storage of fees data, salary, asset records, salary receipts, resource management, and report development. The financial department managed the fee details using 'Fee Manager' software. Students and professors can access student data (monthly, quarterly, and yearly examination records, as well as fee records), both on and off-campus. The finance and administration process for purchase orders, management of petty cash, issue reports, manage revenue, and expenses in 'Escala', a web-based software.

The finance officer stated that;

*"Fee manager software contains students' data including students' admission and monthly fees, outstanding fees, scholarship details, and so on. If a student pay fee in the bank. I directly upload student details in the students' account along with the fee slip number".*

*Data dissemination.* Stakeholders believed that ICT integration enhanced information flow within the administrative department (within the campus and amongst the campuses). With the intranet, USBs, and web apps, stakeholders communicate data at high rates safely. They integrated a database management system (DBMS) and cloud computing, which allows them to access and share data from anywhere.

*Communication.* ICT plays a significant role in sharing information across the board more quickly. The research participants shared that ICT transformed the means of communication. They considered the Internet as the primary medium of communication. The finance and admin staff preferred to communicate through electronic mail and cellular service to ensure the safe dissemination of confidential information. The stakeholders used 'Microsoft Outlook' yahoo mail and other instant mailing applications or desktop software. However, some others use phone calls, send SMS, and android mobile applications to communicate with the principal, students, and

parents. Teachers, principals, and admin staff use telephones, and mobiles to communicate with parents and students. The principal noted that,

*“The stakeholders use five different ICT tools to communicate, such as email, SMS, WhatsApp, instant mailing websites (Gmail, Yahoo). However, few websites were forbidden like Facebook”.*

**Reporting.** The section head shared that reporting is one of the major functions in aligning school activities. The data reveals that reporting has a high priority among the management. The management ensured transparent reporting by integrating innovative technology such as 'Fee Manager,' 'SIS,' and 'Escala'. They prepare fee reports, scholarship reports, salary increment or reduction reports, and build character, provisional, and achievement certificates.

## **Case 2 – A Community-Based School**

**The barriers encountered while using ICT and its effects:** The findings indicate that technology is considered an assistive tool in this school environment. It functions as a catalyst that has increased the users' efficacy and improved the quality of the task. Meanwhile, the participants were concerned that ICT may turn into a destructive agent, erasing all data in a matter of seconds. Teachers were confronted with different obstacles that make it difficult to use ICTs effectively to complete management functions. One of the teachers noted,

*“...we are digital immigrants, we were not born when there was technology. Now we have access to technology, that's why we face more problems”.*

The participants noted that they encounter many challenges while doing schoolwork because of the novelty of the technology. Moreover, a typical problem among the participants is a lack of technical knowledge. The study participants had encountered problems, which affect their routine activities. Disconnection from the Internet, network breakdown, computer failure, and virus attacks are some of the challenges they experienced.

**The methods employed to overcome the obstacles and their effects:** Observations indicate that the managerial activities are difficult to deal with, and while the section heads and principal were observed to work hard to manage the school effectively, the manual method of reporting, and accounting hinder them to attain their potential. However, stakeholders shared that the modern method of task accomplishment with ICT seen as an enabler, to meet various tasks is only possible if ICT is installed and used properly while performing their duties. The research reveals that the difficulties caused are a major concern among the school's stakeholders. The management team therefore employed different techniques to provide barrier-free ICT usage.

**Contact the administration of the school.** To resolve the issues of ICT devices and technology, they approach the administrative team, which includes the administrator and principal. One of the coordinators noted,

*“She contacts the principal and administrative staff to handle the internet and printing issues”*

Further, the administrative staff also contacts technical experts and Internet service providers to troubleshoot the technology failure.

**Data Backup.** The stakeholders use different strategies to store data. The administration and finance staff use two methods to store data. They enter records in registers and store digitally. They

backup data in floppy disks, file servers, hard disks, google drive, and cloud computing platforms to avoid data loss if the technology is damaged.

*ICT workshops and training.* The stakeholders have less expertise and limited information concerning the use of ICT. The school management is determined to enhance the understanding and knowledge of educational technology. Most of the participants attend external workshops and seminars. However, the principal usually conducts in-house professional development sessions and training. They mostly arrange these events during the official holidays.

*Repairing and maintenance of ICT Devices.* The principal and section head had a significant concern for the repair and maintenance of ICT devices. The findings reveal that inappropriate ICT integration, use, and lack of knowledge are the most common causes of the failure of ICT devices. The administration and principal handle the repair and maintenance issues of the ICT devices.

## **DISCUSSION**

The study explored the phenomenon at two secondary-level private schools in an urban setting. The primary purpose of this study was to explore the role of ICT in the effective process of management functions and its effects on management. The empirical data revealed that both schools experience favorable and adverse effects of ICT utilization. Three fundamental aspects of ICT application were noted at the schools. First, it has a significant impact on stakeholders, the school administration, and the school population. Second, the key reason for the successful integration and use of ICTs in achieving managerial responsibilities is the ideal ICT leadership of the stakeholders. Third, it has a huge scope in academics and examination management in both the NGO and community-based schools.

**ICT utilization and its effects:** Computers and laptops were the most common ICT devices that are used increasingly to carry out administrative tasks. Communication, reporting, scheduling, maintaining records, and information exchange become easier because the technology assisted in processing and transmitting data in bits and bytes at millisecond speeds and lends support to the findings of Makewa et al., (2013). This study found that ICT has helped the school leaders build a collaborative team and make collective decisions. The ICT tools assisted the school coordinator in establishing a supportive learning environment at the community school and helped them reach a larger audience (parents, teachers, and students). ICT has become the most convenient way of task completion because it has lessened the user's effort in the accomplishment of the tasks (Wallet & Melgar, 2014). The NGO-based school preferred to use ICT tools to carry out all the managerial duties to attain error-free tasks, and it has assisted the school to be more innovative, meet deadlines, and disseminate more readable data. In keeping with the findings of earlier studies, almost all the management functions are processed with the help of technology (Claude, Hansson, & Ben, 2019) which has a positive effect on users and the quality of tasks (Oluoch 2016). The usage of ICT in school governance and finance has raised the school standard.

This study also found that the workload of administrators is reduced, and this helped with better coordination among the stakeholders. For example, the advanced desktop software and web applications facilitated the school officials in official and regular correspondence and documentation. Besides that, the principal and admin staff were delighted to have ICTs on board as it has enabled the stakeholders to keep track of school activities, improve accountability and administer the financial matters effectively. According to the findings, ICT has the capacity and can effectively execute managerial responsibilities. It allows accounting and department heads to process, review, and generate reports all at once. In keeping with the literature, the traditional means of communication evolved from paper to digital form (Cereci, 2018). The stakeholders use electronic mail, texting, and audio-video conferencing to improve the look of agendas and reports.

Advanced software tools including Google Drive, Excel, WhatsApp, and instant messaging services have aided in this regard.

**ICT leadership:** The stakeholders considered ICT leadership an essential aspect for the provision of ICT-oriented management culture. While barrier-free deployment of ICT resources is difficult to achieve, it was noted that school leaders with exceptional ICT skills can manage and allocate ICT resources and configure the ICT devices and ensure barrier-free ICT utilization. The stakeholders shared that the support and encouragement provided by the senior management led participants to realize optimal ICT utilization. The ICT leaders helped to foster a collaborative and supportive school culture for mutual accomplishment of tasks and resolution of the issues. For example, the stakeholders directly approach the principal and IT personnel without fear through landline, send mail through the web portal, and send reminders about the challenges they encountered through official email IDs. In accordance with the findings in the literature, the school management's optimistic approach and encouragement are crucial factors in proper technology usage (Kafyulilo, Fisser, & Voogt, 2016). It has shifted the role of school heads, which demands enhancement of ICT skills (Madu, Aboyade & Ajayi, 2018) to cope with the new challenges. Further, the findings indicate that one of the most significant requirements in effective ICT use is ICT skills (Beqiri & Tahiri, 2014). The stakeholders emphasized there is a need for more ICT-equipped leaders to provide robust technology and bring the utmost possibilities of ICT to achieve the objectives of the school. The professional development training and workshops were noted as the essential components in enhancing ICT leadership. Further, the timely deployment of ICT resources using technical and other resources cost-effectively assisted with increased administrative abilities (Eremie & Agi, 2020; Madu, Aboyade & Ajayi, 2018). The administration and the principals were actively involved in establishing effective technology integration and aiding stakeholders in becoming more efficient in their jobs. The smooth ICT utilization led stakeholders to be more productive and raise the standard of management and school.

**Management of academics and exams:** ICT is widely used for the management of academics (Rajput, et al., 2020; Ishaq et al., 2020) and examination (Oluoch & Osida, 2014). The study discovered that ICT is widely used in academic and exam preparation in the NGO-based schools. Administrators and teachers utilized ICT to help them to plan, prepare, and present lessons, involve students in online classroom activities, use projector aids to help students understand the lecture, and develop a timetable and datasheet. Because the school has built a virtual platform, it has enabled them to interact with other students via audio-video conferencing, texting, video, and audio calls. The teachers entered students' marks in the management software in each module (class-wise and subject-wise), and computation was done automatically at the backend, making the process of student assessment easy for them. The web applications facilitated the students and parents to browse students' results instantly across the country. This software also helped teachers in the development of progress reports and certificates. The copier machine was integrated to make copies of the result sheets for sharing with the students and parents. Further, the stakeholders revealed that the school has integrated an ICT curriculum to make them aware of the modern trends of ICT. It has enhanced the students' ICT skills and enabled them to use ICT tools meaningfully in their learning. This supports the finding of an earlier study which noted that private schools and universities are interested in implementing a digital curriculum since it has been seen as a source of advancement in education (Salam, et al., 2017). ICT has shifted the mechanisms of instructional and exam management.

## CONCLUSION

This study found that ICT has become an essential component of the private education system in Pakistan. As the world continues to grow rapidly, the significance of ICT is becoming increasingly vital in schools in Pakistan (Jogezai, Ismail & Baloch, 2018). ICT utilization is gradually growing in secondary schools, especially in the NGO-based school environment. The NGO-based schools

have a more organized administration and ICT implementation system as compared to the community-based schools. Both schools have their own unique school system where all departments function together.

Educational institutions all over the world recognize the value of technology in education (Antunes et al., 2021); it has the potential to improve educational and managerial quality (Beqiri & Tahiri, 2014) and it is crucial to comprehend how it works (Cereci, 2018). The stakeholders believed that the smooth operation of the school is not an easy task, however the hand-operated methods and challenges of the technological era lessen the capacities of school leaders in both schools. They believed that ICT has accelerated the acquisition of management functions which has enhanced their trust level. However, it has its own pros and cons and there are different realities on the ground. This study found differences between NGO and community-based schools. The NGO-based schools facilitated their stakeholders with ample ICTs and offer high-level assistance through their high-wage staff and ICT literate school principal. However, the community-based school, teachers were less likely to have experience with ICT usage during school time. They wait for their turn to use the computer and they demand the integration of adequate and required facilities at the school. However, in both schools, the finance and administration staff postulated that ICT devices enabled them to employ a variety of approaches and strategies to complete administrative and financial activities. The principal and section head said that the recent ICT advancements have aided him in attaining high precision and reliability in the supervision and administration of the schools.

Numerous techniques discovered through this qualitative research using a multiple case study methodology were deemed excellent enough to promote optimal ICT adoption. The principals, IT office, and computer science teacher argued that the active ICT integration in management and appropriate ICT utilization depends on the provision of relevant ICT devices and ideal management and leadership skills. It is noted that the optimal ICT integration needs to align the ICT resources through effective planning and organization (Chidobi, 2015) and that has a substantial effect on ICT integration (Kyakulumbye et al., 2012) and utilization. The optimistic results of this study have already motivated the school principals and higher management, who are looking forward to more user-friendly ICT tools with sophisticated integration procedures. However, the stakeholders need facilitation and guidance to enhance their understanding and knowledge regarding modern trends of ICT and its meaningful utilization to attain the true benefits and effectiveness of ICT. As a consequence, the efficiency of management will increase, and the school will be strengthened.

## RECOMMENDATIONS

The research participants of both schools recommended that the management arrange seminars and ICT capacity building training for senior management quarterly or yearly for leadership learning or growth. There is a need to install an advanced and user-friendly ICT infrastructure and make them accessible to the stakeholders. To optimize suitable ICT devices, the administration should propose to establish an ICT department (hierarchical organizational structure) with sub-sections to maximize appropriate ICT integration and utilization.

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