Impact of Information Communication Technology Tools on Teaching and Learning of Secondary School Learners

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Abstract

The implementation of Information Communication Technology (ICT) has streamlined the result-oriented delivery of teaching and learning that has also facilitated the creation of engaging and interactive learning and enhanced the assessment. Although students currently benefit from enhanced access to diverse learning resources, peer collaboration, and self-directed learning due to technological advancements. The study is an attempt to analyze of impacts of ICT on academic and pedagogical effects on the learners of secondary school of Karachi. School learners' curiosity, ideas, and concept development matter for their future educational journey, and schools are unable to develop their competencies in the era of ICT which is a concern of all stakeholders. A survey has been used for the data collection from eight schools from all districts of Karachi. The sample has been collected randomly from the n-8 schools with N=1200 students from class 6th to 10thlevel. SPSS has been used for data analysis. The results reveal that ICT tools have not been used in teaching and learning management. Due to financial constraints, the utilization of ICT devices in classroom management is delayed or ignored. Nonetheless, inadequate electrical supply and poor internet connectivity in most of the areas significantly hinder the use of ICT devices in classrooms, compounded by the need for additional training for teachers from non-technical backgrounds. It is recommended that ICT tools should be used extensively for better learning outcomes at the school level.

Keywords: ICT, Teaching, Learning, School Education, Learners.

Introduction

Students and teachers are increasingly motivated to utilize ICT technologies for effective teaching and learning. To enhance the engagement of the learners, it is essential to initiate novel approaches that include technology that is teacher and student-friendly to cope with the modern needs of education (Sahikh & Abbasi, 2023). Instruction with ICT tools has the potential to transform the academic industry. It is an adaptive learning approach. It offers greater advantages than conventional blackboards and chalk-based instruction. The entire educational process can occasionally seem monotonous for students (Soomro, Bhatti & Soomro, 2023). In the digital age, the utilization of ICT in the classroom is essential for providing students with the opportunity to acquire and implement the necessary 21st-century skills.

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Consequently, examining the concerns and challenges associated with ICT utilization in education can aid educators in surmounting obstacles and achieving proficiency in technology use (Poza & Letzel, 2023). With the emergence of Information and Communications Technologies (ICT) in education, educators establish their perceptions of the use of ICT as an educational instrument, the significance of ICT for student learning outcomes, and their confidence and proficiency. Obstacles impede the integration of ICT in education. The barriers are external to the educator and encompass insufficient resources, time constraints, limited access, and inadequate technical assistance.

The continually evolving nature of computer technology provides a vast array of tools for subject-specific learning. Technology plays a crucial part in all facets of contemporary life. The technical equipment is utilized daily. The utilization of Information and Communication Technologies (ICT) has grown ubiquitous. Information and Communication Technology (ICT) is associated with multiple sectors, including business, transportation, and education. It utilizes blogs, social media platforms, web pages, and similar resources. The majority of contemporary formal education is facilitated through one or more of the following methods: a) the traditional classroom model, b) technology-enhanced learning, and c) blended learning (Khalid, 2011). ICT has been used widely to achieve desired learning outcomes in teaching and learning. The study has a broader scope in the discipline of education. Still, there are only so many studies that have been conducted in this context in an evolving educational context by using AI and ICT in self-learning and teaching. The study will be helpful for policymakers, teachers, and learners to evaluate the scope of ICT in an educational context.

Information and Communication Technology (ICT) in Education
The overarching educational objective for early childhood educators is child development. Information and Communication Technology can facilitate the acquisition and enhancement of reading and language skills at early educational stages. This primarily occurs through collaboration among children at computers, where the quality of discussions can be highly engaging.

Educational communication based on Information and Communication Technology (ICT) offers significant benefits in the education sector. Primarily, Information and Communication Technology (ICT) eliminates the constraints of time and location in the educational context. The adoption of Information and Communication Technology (ICT) in education is attributed to its user-friendliness, speed, accuracy, high reliability, substantial storage capacity, integrity, consistency, logicality, versatility, low failure rate, durability, and, notably, interactivity, which empowers students with control (Lee & Jeon, 2024). Consequently, using Information and Communication Technology (ICT) facilitated educational communication, the student determines the timing, location, and extent of topic content to engage with, following their available time. The learners progress at their own pace in mastering concepts, contingent upon their proficiency with information and communication technology (ICT).

In summary, it promotes student independence. The Grey Revolution corresponds with actual teaching and learning scenarios in the educational sector. The instructional activity is entirely focused on the learner and the learning process.

The study encompasses a wide array of ICT gadgets, including computers (desktops and laptops), printing equipment, projectors, smart boards, internet access, webcams, CD/DVD players, and other similar devices (Islam & Inan, 2021). Most countries possess a curricular framework that delineates overarching principles for the integration of ICT into educational programs. Nonetheless, this survey was conducted in a developing nation, specifically Pakistan, Karachi Sindh, where academic institutions, especially in the areas, continue to struggle with obtaining

even the most basic technologies (Jamil & Muschert, 2024). In the context of Sindh, where this research was conducted because there is a dire need to understand well the practices of ICT tools used for teaching and learning and their implantation at school levels. It is very important to understand whether schools are adopting technological benefits at the school level in the public sector or not. What kind of challenges these schools are facing in implementing ICT tools at the school level? How the government is supporting in implementing the learning and pedagogical practices at schools for better learner engagement and better learning outcomes.

Research Questions
RQ: 01. What Information Communication Tools are used for teaching and learning at the school learners?
RQ: 02. What is the impact of ICT tools impacts on teaching and learning at the school level?
RQ: 03. What are the challenges of using ICT tools for teaching and learning at the school level?

Literature Review

The phrase "information and communication technology," sometimes abbreviated as "ICT," has become a significant asset for enhancing educational standards worldwide. It has been utilized in academic environments with the anticipation that it would improve the enjoyment of the teaching and learning experience for students (Jamali, 2023). The shift from traditional classroom-based teaching and learning is attainable through the innovative application of information and communication technologies, accessible at any time and from any location. In recent years, Sindh has also embraced ICT to enhance educational opportunities, along with current trends (Jillani et al., 2024). Information and Communication Technology (ICT) has been emphasized in both the policy and the curriculum. The government, non-governmental organizations (NGOs), and various development partners are all contributing to a crucial function in the execution of ICT within the educational framework (Pervaiz et al., 2024).

The deployment of advanced information and communications technology solutions seeks to supplant the traditional education system with technology-integrated instruction, particularly in remote regions where underprivileged students have limited access to quality education (Lee & Jeon, 2024; Siddiqui, Lashari & Soomro, 2023). Thus, it also bridges the divide in internet access between suburban and urban areas. Furthermore, to guarantee that students have a 21st-century education, the material producers have integrated ICT into the teaching and learning process (Khan, Rahman & Islam, 2021). This has resulted in the integration of ICT classes into the curricula across many educational levels and the establishment of training programs for educators. The latest alterations performed by schools have transpired inside complex instructional environments due to the integration of ICT with necessary adjustments. Education, as a facet of social structure, is closely associated with various social attributes, including the ability of students and teachers to engage interpersonally and their mutual trust. Historically, developed economies and Western-led organizations have dominated the formulation of international education policies; however, numerous international entities, including the United Nations (UN) and its agencies like UNESCO and UNICEF, are now implementing initiatives to integrate local education systems into the broader framework of globalization (Rahman, Uddin & Dev, 2021; Zehra et al., 2022). This is accurate, notwithstanding the historical predominance of prosperous economies and organizations in shaping international education policies.

Consequently, donor nations are increasingly collaborating with developing countries to formulate education policies that adopt a global perspective (Simming, Asad & Lashari, 2015). Conversely,

in poor countries, such cooperation usually occurs with government officials, who typically need to improve their understanding of their nation's educational needs. A departmental research study could be beneficial in emerging regions such as Sindh to enhance knowledge of the personnel inside educational systems.

In recent years, educational institutions have increasingly utilized numerous devices associated with information and communication technology (ICT). Research indicates that the utilization of ICT technologies can positively impact teaching and learning outcomes, particularly regarding student involvement, motivation, and achievement (Toma et al., 2023). Research indicates that the integration of information and communication technology (ICT) devices in educational settings, including desktops, laptops, and smartphones, facilitates enhanced class participation and collaborative learning while also allowing students direct access to a diverse array of digital resources and online tools (Sun, Xie & Lavonen, 2024; Zehra et al., 2022). Devices utilizing information and communications technology (ICT) can assist in facilitating differentiated education (Khemchand, Kang & Lashari, 2024), allowing educators to tailor their teachings to the distinct needs and preferences of individual students. Nonetheless, significant worries exist regarding the potential adverse effects of utilizing ICT in educational environments, including heightened risks of distraction and a reduction in face-to-face interactions (Shaikh et al., 2023; Parvaiz et al., 2024). Consequently, educators and educational institutions must utilize information and communications technology (ICT) tools strategically and intentionally while also offering students the necessary guidance and support to ensure their efficient and secure use of these tools (Ahmad et al., 2023; Albirini, 2006). Research indicates that the effective utilization of information and communication technology (ICT) tools can significantly enhance teaching and learning outcomes, and they are likely to remain integral to educational environments in the future (Shaikh et al., 2023).

The heightened utilization of ICT is significantly influencing the frameworks of our educational institutions and the conventional methodologies of schooling. An active state of mind influences our social, moral, professional, and economic values (Shaikh & Abbasi, 2024). The utilization of ICT is regarded as a mechanism capable of transforming education, augmenting the curriculum, fostering philosophical development, and enhancing student learning outcomes (Albirini, 2006) Siddiqui, Lashari & Dahani, 2024). The integration of ICT into the educational process is largely contingent upon the initiatives undertaken by educators. The incorporation of ICT into a school's curriculum should primarily aim to enhance students' ability to utilize, manage, and understand ICT (Khan et al., 2023). To achieve this objective, educators must possess enough ICT training and preparedness.

Furthermore, the research sought to ascertain whether the duration of their teaching experience and their proficiency in computer usage correlated with their utilization of ICT for educational reasons (Biswas, Roy & Roy, 2020). Instructors must inevitably enhance their technical skills; this section discusses many tools available to achieve that objective. This will enable this prospect to materialize (Bolaji & Jimoh, 2023; Imran, Qazmi & Lashari, 2022). Consequently, it is imperative to ascertain all facets of ICT that enhance the efficacy of the teaching and learning process in secondary education.

Method and Procedure

The study used a quantitative approach for the data collection and analysis. A survey has been used to collect the data from eight popular schools in Karachi. The school's selection was random to ensure the schools of district south Karachi. The data has been collected by using a translated

version of the survey questionnaire to get a rich data set from the learners. The questionnaire data was collected through a Google survey form by physically visiting the schools. 70% of participants were male students who participated in the study, and 30% were female students who were enrolled in class 6 to class 10. Surveys have been used as a robust method of data collection in order to save time, energy, and cost. Surveys have been more accessible to collect a wide range of data.

Table 1: Name of schools and respondent distribution

| S. No.	Name of the School	Male	Female
1	Government Boys Primary School, F. B. Area, Liaquatabad Town	125	75
2	Government Boys Primary School, North Karachi	125	66
3	Karachi Academy Government Boys Secondary School, Azizabad, F.B. Area	112	47
4	Narayan Jagannath High School	98	37
5	S.M. Public Government Boys & Girls Secondary School, Nazimabad, Liaquatabad Town	56	45
6	Y.M.C.A. Secondary School, Saadar Town	85	35
7	SM Board Quaid-i-Azam Public School	124	55
8	Merab Educational System	115	62
	Total	840	360

The table results show that students from different schools of different districts have participated in the study. The data was collected from the most popular schools in Karachi. N=1200 participants have participated in the survey. The survey was in a translated version and was collected by using Google online survey form. A total of N=8 schools were selected randomly for the well representation of the sample. Most of the students are boys which is 70% of the total sample size participated in the study. The 360 students who participated in the study were female students from different schools in Karachi which is 30% of the total population. It took one month to complete the survey results to physically visit the schools to interact with the management and seek permission.

Figure 1: The details of the students who participated in the study
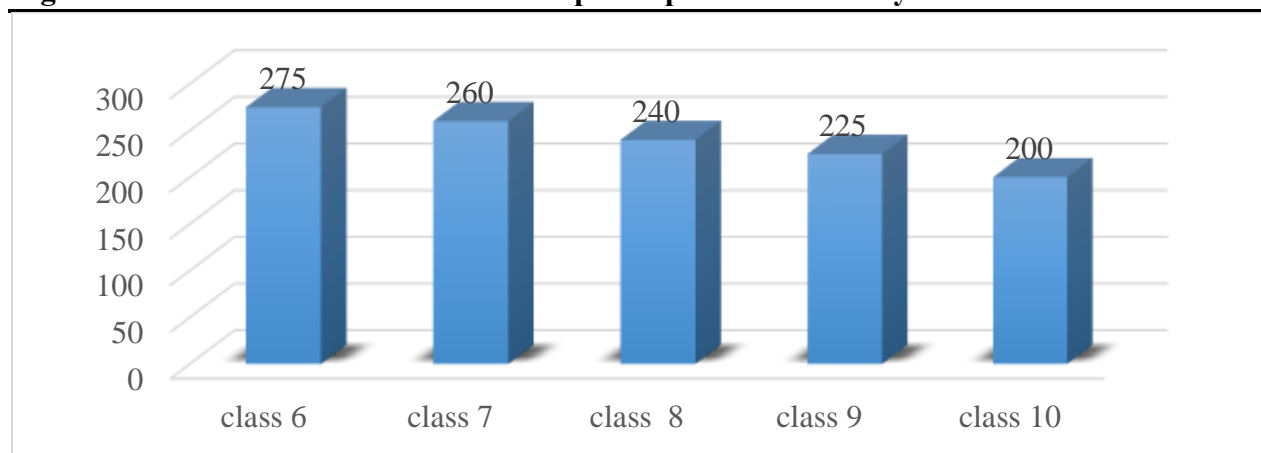
Distribution of samples according to respondents' educational attainment A substantial number of students are enrolled in secondary schools. The majority of respondents are currently enrolled in secondary schools for grades 6 to 8. Only 22.9% of the respondents originated from class 6, indicating a relatively low educational attainment class seven represented 21.6%, and class 8 represented. The findings indicate that the reliability of the responses concerning the research objective may be enhanced, as the majority of respondents possess better educational qualifications within the study's context. At the highest educational level (Class 10), there is an equal representation (16%) of participants from secondary public sector schools in Karachi.

Figure 2: The statistics of the use of ICT Tools for Learning at the schools of Karachi
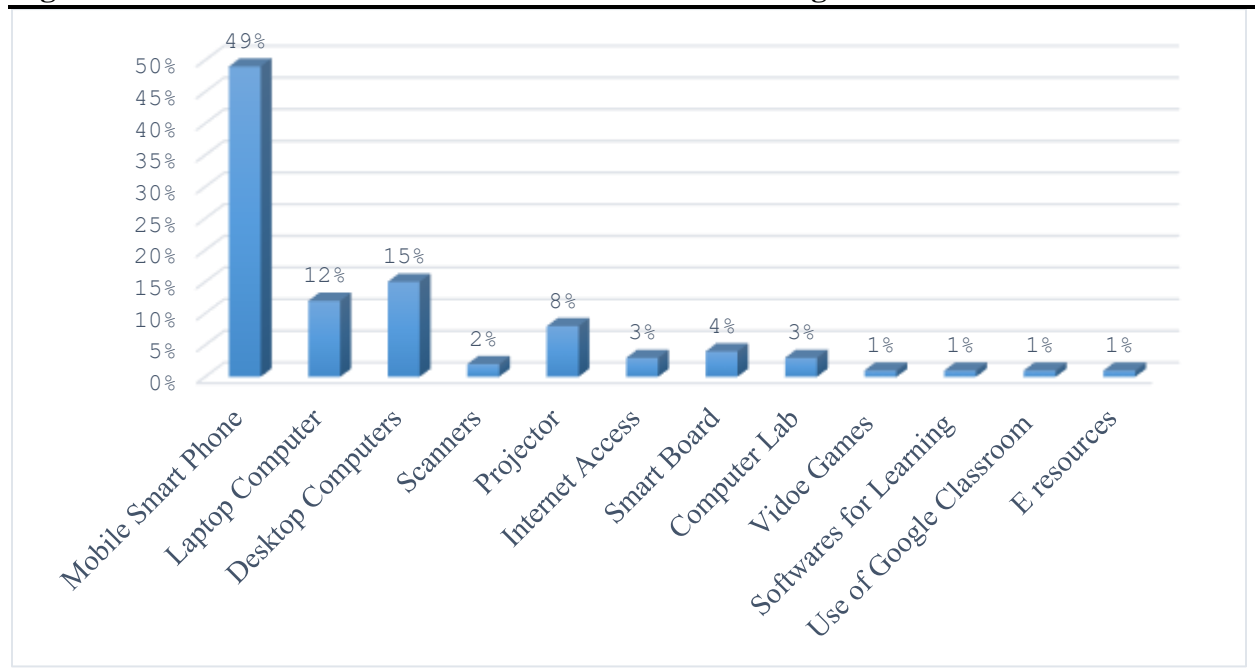
According to the statistics, most educators use smartphones for instructional purposes. Educational institutions account for 49% of study and teaching users. Only 8% of schools use projectors for teaching and learning, even though 15% of respondents use desktop computers and 12% use laptops. In addition, 4% of schools employ smartboards for teaching and learning. Three percent of schools have computer labs for teaching and learning, and three percent have internet.

Discussion

Based on the findings, it is evident that the majority of educators make use of their smartphones as one of the tools for educational purposes. It has been discovered that 49 percent of the users of study and teaching are found in educational institutions. Although the majority of the respondents utilize desktop computers for their teaching and learning, which accounts for 15% of the total, and laptop computers, which account for 12% of the total, only 8% of schools have projectors that are used for teaching and learning. Additionally, 4% of schools use smartboards for both teaching and learning purposes. The percentage of schools that have computer labs for teaching and study is three percent, whereas only three percent of institutes have internet access.

No obstacle is greater than the capabilities of the information and communication technology (ICT) equipment that is provided by the educational institution. This is the case even though the ICT equipment has considerable potential and is easily accessible. These are some of the most significant issues that educators face, and they are as follows: One of the most common problems that occurs in suburban areas is load shedding. As a result of inadequate funding and resources for multimedia classrooms, schools do not have sufficient information and communication technology (ICT) instruments that are equipped with the most recent technology. The lack of information and communication technology (ICT) tools for teaching and learning has been reported by a significant number of students attending schools that do not have access to computers or the Internet.

II. According to the official documentation, the schools do not have desktop computers or computer laboratories for teaching purposes because of financial limits and worries about the safety of the students. It has been observed that even teachers who have received training are hesitant to participate in instruction that is dependent on information and communication technology.

Generally speaking, it has been observed that the lack of internet access in schools, in conjunction with the oftentimes pessimistic attitude of non-technical educators towards new technology as a result of inadequate training, is an instruction barrier that is based on information and communication technology (ICT).

Conclusion

The objective of this research was to present findings regarding the challenges encountered by instructors in utilizing ICT within their teaching-learning process. The study's findings reveal that educators possess a robust inclination towards the incorporation of ICT in education; nevertheless, they face numerous obstacles in doing so. These findings consequently suggest the necessity of training teachers to become habitual users of ICT, emphasizing the acquisition of fundamental IT skills. Given that confidence, competence, and accessibility are essential elements for technology integration in institutions, it is imperative to furnish teachers with ICT resources, encompassing software and hardware, along with effective professional development, adequate time, appropriate training, and technical support. No single component is adequate to ensure effective instruction.

Educators must utilize the ICT resources provided by institutions. They must be adequately prepared before entering the teaching profession. In the absence of training, educators might equip themselves by participating in individual sessions or through self-directed learning. They should be open-minded regarding innovative instructional methodologies. In the absence of support, they must identify methods to address issues related to their utilization of ICT in institutions. Ultimately, educators must develop self-organization abilities to significantly enhance their effectiveness in conducting classes utilizing ICT.

The majority of instructors and students in secondary schools do not possess a robust foundation in essential ICT skills due to advancements in information technology over recent decades, alongside the utilization of computers, and good internet for information access, information exchange, and communication. Nonetheless, they remain deficient in specific advanced ICT competencies, including blended learning, the design and deployment of learning management systems (LMS), blogging, and other domains. Consequently, educators need to engage in training particularly designed to enhance these skills.

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