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# ICT Integration in Teaching and Learning at GECEs Larkana: Prospects and Challenges

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## Abstract

The integration of ICT (information communication technology) plays a significant role in improving the quality of education. However, it's effective implementation in underdeveloped city of Pakistan such as Larkana is under-explored. The study aimed to explore the perception of teacher educators about ICT and its integration in different subjects, examine the view of prospective teachers regarding the ICT integration skills and to understand the challenges faced by GECEs Larkana in implementation the objectives of NPSTP standard 7. The study adopted qualitative research design, interpretivist Paradigm, inductive approach and phenomenological research strategy. Data was collected through semi structural interviews from four teacher educators and four prospective teachers. Data was analysed manually using Braun and Clarke (2006) framework of thematic analysis. The analysis revealed five major themes name as perception and significance of ICT in teacher education, practices of ICT integration in teaching and learning, institutional support and resources challenges in effective ICT integration and policy and professional development. The finding identified that Teacher educators showed positive perspectives towards ICT and its integration in different subjects, prospective teachers demonstrated awareness of the significance of ICT for future teachers but identified significant gaps in their advanced ICT integration skills. However major challenge such as electricity disruption, connectivity issues and attitudinal resistance towards ICT among older teachers limit the implementation of ICT. The study concluded that GECEs have basic knowledge of ICT but its implementation is limited to content delivery. There is still need of trainings, better infrastructure and addressing the policy barriers for effective integration of ICT. The finding is discussed under the light of TPACK framework develop by Mishra and Koehler (2006).

**Keywords**: ICT integration, teacher educators, prospective teachers, GECEs, TPACK, NPSTP, qualitative research, Larkana, Pakistan.

## Introduction

Education aims to enhance learners holistically. It promotes intellectual, emotional, social and physical aspects of a learner. 21 century education stresses that education not only focuses on academic excellence but promotes students critical thinking skills, cooperation, emotion management and make them responsible citizens (UNESCO, 2015). According to Sikandar (2015) John Dewey explains that education is a procedure of reorganizing or reconstructing experience, that improves the importance of experience" and encourage the beginners to successfully manage their future learning.

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Worldwide, ICT acknowledged as an agent for enhance the access of knowledge, information, instructional quality and improve the active learning and allow learners to actively participate. ICT is not just a digital tool but an agent for reform and encourage the learner-centered learning, learning environment and personalised instruction (European Commission, 2008). ICT is well-recognized as a highly impactful agent in education, particularly in driving educational change, promoting student-centered learning, introducing new approaches to instructional planning, and equipping students with the necessary resources (Tondeur et al., 2017). ICT integration in teacher education is essential because trainee teachers learn the effective use of ICT integration and then use it in the classroom (Koehler & Mishra, 2009).

The national educational policy 2017-2025 emphasizes the significance of ICT as a driver to improve the quality of education in Pakistan. ICT integration includes the intended implementation of modern technologies to improve the quality of education. Punie et al. (2006) highlights that including ICT into teaching and learning process can improves the engagement, learning enhancement, and student interaction with the help of multimedia tools and collaborative tasks.

In Pakistan the implementation of ICT in education is important and very challenging. The National Education Policy (NEP 2009–2015) acknowledges the significance of ICT for the improvement of quality education, teachers' competency and effectiveness of the system. The policy highlights the Pakistan's coordination with worldwide education trends, dealing with the limitations of quality. The NEP highlights the requirements of ICT innovation, technological learning tools, and digital technology supported trainings. ICT is considered as crucial element for improvement the educational system of Pakistan. (NEP, 2009–2015). EdTech Hub (2022) shows that ICT implementation is generally unequally spread between urban and rural areas of Pakistan; the rural institutions encounter more significant challenges.

Despite of the National Educational Policy (2009–2015) the integration of ICT in Government Elementary Colleges of Education (GECEs) is unclear. In GECEs Larkana, ICT resources may available, but the use of ICT depends on the teachers' perceptions, readiness and pedagogical competency. Therefore, the study aims to examines the integration of ICT in education systems of government elementary colleges of Larkana, emphasizing on the challenges and prospects. To take insight for the use of ICT, available resources, support of institutes and observers the barriers which are hindering in the implementation of ICT in different subjects.

**Research Objectives**

1. To explore the perceptions of teacher educators about ICT tools and its integration in teaching different subjects
2. To examine the prospective teachers views about their ICT integration skills
3. To understand the challenges GECEs face in implementing the objectives of NPSTP's standard related to ICT

**Research Questions**

1. What are the perceptions of teacher educators about ICT tools and its integration in teaching different subjects?
2. How prospective teachers view about their ICT integration skills?

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3. What challenges GECEs face in implementing the objectives of NPSTP's standard on ICT?

### Statement of Problem

The integration of ICT in elementary colleges is very essential to equip future teacher with 21-century skills. Globally, ICT integration can boost the teacher's efficiency and students learning if used with consistence in the instructional system (European Commission, 2008; Ratheeswari, 2018). In Pakistan, the National Educational Policy (2009–2015) show ICT as very significant element for strengthening the quality of education, and NPSTP contain a devoted standard on ICT skills that educators must acquire in their training of pre service. Despite the Policy initiatives the integration of ICT in Government Elementary Colleges of Education (GECEs) is unclear. Teachers' perceptions, readiness and pedagogical competency influence on the adaptation of ICT and its use in classroom practices (European Commission, 2008). yet limited empirical insight are available on how teachers use ICT in teaching different subjects in GECEs and ICT competency of prospective teachers.

## Literature Review

### Concept of Education in the Digital Era

In modern times the concept education shift from traditional to the modern, from teacher-centered to learner-centered and includes technology in classroom practices (Trilling & Fadel, 2009). In 21st century the education goes through a rapid change due to globalization and technological innovation. With time traditional approach of education rapidly changes from teacher-centered approach to student-centered approach, it focuses on collaboration, critical thinking and lifelong learning (Trilling & Fadel, 2009). According to the Dewey's (1938) education philosophy learning is based on experiential and process of reflection, this concept aligns strongly with digital learning. As a qualitative point of view, education in the21 contemporary environment viewed as a process of socially constructed shaped with the interactions between educators, learners and technologies (Selwyn, 2011).

### The role of technology in modern education

Technology plays a significant role in contemporary education, it works as a fundamental tool for assessment, communication, and boost professional development. Fullan (2013) views that only technology doesn`t improve learning; but effectiveness of learning depends on its alignment of technology with instructional goals and pedagogy. Educators view technology as a source to access resources, facilitating co-operative learning environment and supporting differentiated instructions (Voogt et al., 2013). Research shows that pedagogical clarity is important without its technology strength traditional teaching models instead of transform them (Selwyn, 2016).

### Role of ICT in Teaching and Learning

ICT supports educational processes by adding visual, interactive, and co-operative instructional practices. Online platforms, simulations, and multimedia presentations allow educators to describe complex ideas more efficiently and facilitate learners with diverse learning styles (Means et al., 2013). Qualitative studies unveil that educators often tie use of ICT with enhanced

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student motivation and engagement. However, fear of technical failure, and lack of confidence affect teachers' readiness to implement technology (Ertmer & Ottenbreit-Leftwich, 2019). These discoveries highlight that ICT integration is not just a technical process but intensely individual and experiential one.

**ICT Integration in the Context of Pakistan**

ICT integration has been highlighted in national education policies of Pakistan. it includes in the National Education Policy (Government of Pakistan, 2009). Still, qualitative evidence recommends that implementation of ICT remains irregular and uneven due to administrative constraints, infrastructural limitations and lack of training. Public-sector teachers' education institutions face other challenges associated to funding, contextual realities and policy-practice gaps (Selwyn, 2016). These barriers are mainly obvious in smaller cities such as Larkana.

**Research Gap**

The literature reviewed show that integration of Information and Communication Technology (ICT) has been studied nationally and internationally. International studies mainly focus on digital skills, professional development, support of institutes, teachers' pedagogical beliefs, it argues that ICT integration not only depend on technology but it depends on multiple factors such as readiness, contextual factors and perception.Nation studies in Pakistan showed positive attitudes of teachers towards ICT but they reported many challenges that hindering in integration such as poor infrastructure, lack of practical trainings, limited professional development and lack of institutional support. These studies provide significant insights, but they primary focus was on public schools or teacher educational institutes of urban areas. A research gap exists in the literature concerning to the context-specific qualitative research on ICT integration in GECEs (Government Elementary Colleges of Education), especially in rural cities such as Larkana. The study seeks to fill the gap in existing literature by provides context-sensitive insights through carrying out in-depth qualitative exploration of ICT integration in GECEs of Larkana.

**Theoretical framework**

The research is theoretical based on TPACK technological pedagogical content model, proposed by Mishra and Koehler (2006). The TPACK framework based on Shulman's (1986) concept of PCK pedagogical Content Knowledge focuses on significant role of technology in teaching and learning. The TPACK framework have three domains of knowledge: content knowledge (CK), pedagogical Knowledge (pk), and Technological knowledge (Tk). Content knowledge describes as the understanding of a teacher about their subject matter. Pedagogical knowledge refers to expertise of teaching methods and strategies. Technological knowledge refers to the knowledge about digital tools and their implications. In the view of Mishra and koehler (2006) to integrate ICT effectively, it depends on mastery these domains collective rather than focusing on them separately. TPACK model helps the study in examining the prospective teachers and teachers' perspective about ICT integration. It provides a framework that how content knowledge influences the pedagogy and the implementation of ICT in classroom practices.

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## Research Methodology

### Research philosophy and approach

The research adopts interpretivist paradigm to understanding experiences, challenges and perspectives of teachers and prospective teachers in the process of integration of ICT in GECEs Larkana. Interpretivism assumes that reality is socially constructed through the human interactions and the best way to understood that through exploring the lived experiences of individuals (Schwandt, 2014). An inductive approach adopted in this study. Inductive method including deriving patterns, categories, themes, and theoretical insight from empirical data rather than testing hypothesis from existing theories (Saunders et al., 2019).

### Research strategy, design and time horizon

The research strategy followed in this study is phenomenology, to explore and describe the participants experience in the process of ICT integration in GECEs Larkana. The aim of phenomenology is to describe and explore the lived experience of individuals about particular phenomenon to identify the essence (Moustakas, 1994; Van Manen, 2017). Qualitative design, mono-method was adopted in this study, applying a single method for data collection. Mono-method designs are suitable when the objective of the research is to go in depth instead of breadth Saunders et al. (2019). This study followed a cross-sectional time horizon; the data were collected at a single point of time.

### Research setting and participants

The study was conducted in GECEs (Government Elementary Colleges of Education) Larkana. GECEs are public-sector education institutes for teachers, which are responsible for preparing trainee teachers for elementary education. The population of the study includes Teachers currently teaching in GECEs Larkana and have minimum 10 years of experience, teacher who are expert in their respective areas. Prospective teachers enrolled in GECEs Larkana. purposive sampling technique was used for the selection of participants. Sample size is consist of 8 participates, 4 teacher educators (T1-T4) and 4 prospective teachers (P1-P4).

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**Data collection and Analysis**

The data collection tool adopted in this study was semi-structured in-depth interviews. semi-structured in-depth interviews was selected because its alignment with phenomenology to collect in-depth data form participants lived experiences. In-depth interviews provide participants with the opportunity to describe their feelings, thoughts and experiences in their own worlds from their personal perspective. Therefore, provides detailed and rich qualitative data (Creswell & Poth, 2018). Thematic analysis was used to analyzed the data. The six-phase framework developed by Braun and Clarke`s (2006) was followed to analyzed the data. This method involves six steps. Thematic analysis is suitable for phenomenological research it supports identification of meanings from participants shared experience (Nowell et al., 2017).

## Discussion of Findings

**Finding 1: Teachers and prospective teachers have positive perception towards ICT and its usage in teaching and learning**

Theme 1: perceptions and important of ICT teacher education

Sub theme 1: perception about ICT

The finding shows that teacher and prospective teachers have positive perception about ICT and its integration in education. Teacher educators expressed that ICT integration can enhanced the engagement of students. ICT make learning more interesting; it grabs students' attention and make learning fun. ICT help teacher educators in make lesson plans more interesting by adding visual with the use of ICT. Similar this study is supported at national literature by Hussain (2024) who examined the perspective teacher's opinion regarding ICT in Pakistan

and the result of the study shows that positive perception about technology integration. Ishaq et al. (2023) study shows that teacher mostly perceived ICT as significant tool that makes lesson more interactive, boost student motivation, enhance understanding of complex concepts. Internationally this finding aligns with Ngao et al. (2022) who examined teacher educators, perceptions and practices of ICT integration teacher education programs and found positive perception significantly influence the adaptation of ICT in teaching and learning. Serrano et al. Found that technology significantly enhance Student learning and improve student engagement in higher education via blended learning and interactive approaches.

**Finding 2: Teachers integrate ICT in different subjects such as English, science, and**

**child development.**

Theme 2: practices of ICT integration in teaching and learning

Sub theme 1: instructional integration of ICT

These findings suggest that ICT significant benefits across different areas and Participants use different strategies to integrate ICT in their teaching. It makes teaching much more effective, integrating ICT in differentiated instructions can help teachers and fulfilling students' diverse needs. The finding is supported by national literature, Nazim et al. (2022) find out that ICT was

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noticeably more effective than traditional teaching method and highlighted the subject specific benefits in different curriculum areas from examined the effectiveness of ICT in teaching general science at elementary level in Rawalpindi Pakistan. This finding is supported at international level by Area-Moreira et al. (2016) identified various methods of ICT integration in classroom instructions highlighted that instruction integration required systematic planning and pedagogical alignment.

**Finding 3: Perspective teachers show awareness about ICT but also identify gaps in their ICT skills.**

Theme 2: practices of ICT integration in teaching and learning

Sub theme 2: prospective teachers ICT integration skills

The finding shows that perspective teachers know the significance of ICT but there are still needs of advanced curriculum and digital tools for prospective teachers of GECEs Larkana. GECEs still need to bridge the gap between the basic ICT knowledge to modern ICT tools to fulfil the modern need of learning. The main findings are support at international level by Redecker (2022) explore teachers' digital competence and found that in process of demonstrated basic technological skills many teachers had lack of confidence in applying technology for collaboration, learner empowerment and assessment. At National level Jamil et al. (2025) surveyed 600 prospective teachers and found a major gap where teachers confidently demonstrated basic digital skill but showed deficiency in innovative and advanced pedagogical tools.

**Finding 4: Basic resources are available but there is need of maintenance and further improvements.**

Theme 3: Institutional support and resources

These finding reveal availability of basic resources but the need of maintenance and better infrastructure in GECEs Larkana is part of broader pattern that showed across the world. The finding is support at national level by study of Raza and Akhtar (2024) on examining ICT resources in teacher training programs in Pakistan and result showed that ICT resources are available in the institutes but they were insufficient and need improvement to empower educators and improve student skills. At the international level fidelis and Onyango (2021) reveal that schools in developing countries face significant challenges of non-availability of ICT facilities and internet connection and emphasised that government much provide funds for ICT resources and maintenance.

**Findings 5: Lack of acceptance is the major challenge identified among the older teachers.**

Theme 4: challenges in effective ICT integration

Sub theme 1: infrastructural and technical barriers

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These finding revealed that attitudinal resistance among older teachers' educators is significant barrier in integration of ICT, GECEs highlighted the need of professional strategies to address this challenge. The finding is strongly supported at National level by Muhammad et al. (2025) who conducted the study in Pakistan and took 20 older teachers who are 55+ in their age and found that older teachers face challenges and resisted to integrate ICT. International literature support this Mehdaoui (204) conducted a study to examine teachers' resistance towards AI and ICT integration and result shows that educators perceived it as a threat and had lack of confidence, inadequate training and attitudinal resistance are critical barriers.

**Finding 6: Participant highlighted limited implementation of ICT policy (NPSTP).**

Theme 4: challenges in effective ICT integration

Sub theme 2: implementation of ICT policy (NPSTP)

These finding showed that limited implementation of NPSTPs. GECEs are facing the major challenge which is the gap between policy intention and its practical execution which is affecting the integration of ICT. The finding is supported at National level by Arif et al. (2025) conducted an empirical and theoretical examination of effectiveness of NPSTP in primary teacher training of Pakistan and found the major gaps between the policy intentions and its actual implementation. At international level kennedy (2023) highlighted the gaps in policy implementation are a common challenge in educational context of developing countries. Poorly defined implementation procedures, inadequate training and lack of ICT infrastructure are the major challenge which are hindering ICT policy integration in teacher education programs.

**Finding 7: Participant highlighted there is need of training specifically for ICT**

**integration**

Theme 5: policy and professional development

The finding showed that participant of GECEs Larkana recognized the importance of ICT training and highlighted the need for practical and comprehensive trainings. Nationally the finding is supported by Phulpoto et al. (2024) who conducted a study on barriers affecting teacher performance in e-learning at public universities in Pakistan and result showed that inadequate support and technical training are significant barrier in effective integration of ICT and highlighted the significant need of practical and comprehensive ICT training programs. An international study to investigate teachers' readiness for ICT integration in educational institutions is conducted by Scherer et al. (2020). The results showed that teachers' readiness for ICT integration is based on multiple factors such as understanding of pedagogy, emotional readiness, support of institutes and competence of technology. Respondents' response that's unclear policy guidelines and lack of training had affect their motivation and confidence in negative way to integrate ICT.

## Conclusion

The study was aim to explore the perception of teacher educators and prospective teacher about ICT integration and its implementation in different subjects, the challenges faced by GECEs larkana in the implementation of NPSTP standard 7. The research design of the study was

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qualitative and the research approach was phenomenology to understand the lived experiences of the participants. The total number of participants was eight, which include teacher educators and prospective teachers who selected through the purposive sampling. The data was collected through semi structural interviews. The data analysed by thematic analysis. For analysis of data the researcher followed the brown and clerks model of data analysis. Five major themes were emerged from the data. The themes were perceptions and importance of ICT in teacher education**,** practices of ICT integration in teaching and learning, Institutional support and resources**,** Challenges in effective ICT integration**,** policy and professional development. The analysis of the data showed that teachers and perspective teacher had positive perception about ICT. Teacher educators looked ICT as a significant tool which boosts the engagement of the students. Perspective teacher view ICT integration skill as a core skill for the teaching in the future. Teacher educators integrated ICT in different subjects as well. However, the implementation of NPSTP standard 7 is very limited due to lack of acceptance, lack of training on implementation of ICT in the classrooms and unwillingness of the educators. ICT has the potential to improve the quality of teaching and learning, but it effectiveness integration and NPSTP standard 7 implementation is limited due to gaps in resources, training, acceptance and institutional support.

## Recommendations

1. In the light of the findings these recommendations are suggested for the administrators that they should facilitate teacher with adequate resources such as stable electricity, internet connection, maintenance, projects and smart boards. stable electricity ensure that learning will went smooth without any interruption of the electricity.
2. The study suggests that Teacher educators not only believe that ICT is very helpful in teaching but also integrated it into their lesson plans and other classroom activities. Teacher educators should accept the ICT and learn the ICT skills.
3. Based on the findings of the study the following recommendations are proposed: prospective teachers should learn the basic and advance ICT skills such as AI (artificial intelligence). It will improve the quality of teaching open the new ways of teaching and learning. Prospective teachers should ready for the evolution in the field education, not stick to the traditional teaching methods. Prospective teachers should use online resources for improving their academics and digital literacy.
4. The study suggests that policy makers should strengthen the implementation of NPSTP standard 7 also make teams for evaluating and monitoring the application of the policies on the ground level.
5. Future researcher should conduct this research in other contexts such as private and public, rural and urban schools, colleges and universities.

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