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TRAINED BUT NOT YET USING? ICT TRAINING AND CLASSROOM USE AMONG ELEMENTARY SCHOOL TEACHERS IN PUNJAB, PAKISTAN

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Abstract

Information and Communication Technology (ICT) competence is a key expectation of teachers under Pakistan's National Professional Standards for Teachers, and its importance became especially evident during COVID-19 school closures. This study examined the ICT training, access, and classroom use reported by public elementary school teachers in Punjab, Pakistan. Using a cross-sectional survey, data were collected online from 568 teachers working in 20 schools across Lahore and Kasur districts. A 30-item questionnaire assessed training received, access to digital resources, and the use of ICT for teaching and record-keeping on a five-point scale. The instrument showed high internal consistency for the ICT items (Cronbach's alpha = .91). Teachers' mean ICT score was 2.79 (SD = 0.83), significantly below the scale midpoint of 3, indicating limited preparation, access, and routine use. Teachers in Lahore scored slightly higher than those in Kasur (2.85 versus 2.72), but the difference was not statistically significant. Similarly, no significant differences were found between urban and rural teachers or between male and female teachers, and all group means remained below the midpoint. These findings suggest that inadequate ICT preparation and use constitute a system-wide issue rather than a problem confined to particular locations or demographic groups. To translate professional standards into classroom practice, education authorities should provide reliable devices and connectivity, sustained hands-on training, follow-up mentoring, and opportunities to apply digital skills in lesson planning, assessment, instruction, and record-keeping. Further research should examine training, access, and use separately and include classroom observations across additional districts.

Keywords: ICT; Digital Competence; Teacher Training; Elementary Teachers; National Professional Standards for Teachers; Pakistan

1. Introduction

Digital technology has become part of everyday teaching in many parts of the world. Teachers are expected to use computers and the internet to prepare lessons, present information, assess pupils and keep records, and international frameworks set out the ICT competencies teachers need at each stage of their careers (UNESCO, 2018). In Pakistan, effective communication and proficient use of ICT form one of the ten National Professional Standards for Teachers (Ministry of Education, 2009).

The COVID-19 school closures showed how important these competencies are, and how unevenly they are distributed. Rural teachers and pupils in Pakistan faced unpreparedness, heavy workloads and poor access to devices and connectivity when teaching moved online (Noor et al., 2020; Zamir & Wang, 2023). Yet there is limited evidence on how much ICT training elementary teachers in Pakistan have received and

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how often they use ICT in their work.

This study addresses that gap. It asks how much ICT training and use public elementary teachers in two districts of Punjab report, and whether this differs between urban and rural schools, between districts and between male and female teachers.

2. Literature Review

2.1 Teachers' ICT Competence

Teachers' ICT competence covers more than basic computer skills (Mishra & Koehler, 2006; Redecker, 2017). UNESCO's ICT Competency Framework for Teachers describes a progression from acquiring knowledge of technology, through deepening its use in teaching, to creating new knowledge with it, across areas such as pedagogy, curriculum and assessment, and teachers' professional learning (UNESCO, 2018). In Pakistan, a recent study of preservice teachers in middle schools linked digital literacy competence with their teaching practices (Jamil et al., 2025).

The use of information and communication technology (ICT) in educational institutions is not only based on the availability of the digital resources, but also on the preparedness of teachers, their competencies and the institutional support (Akram et al., 2022; Ertmer, 1999).

Teacher preparation is also an essential element to making reforms in education a reality in the classroom. Since teachers' training, competency development and gaps in teacher professional development are highlighted in the discussion, the provision of relevant skills to address changing educational demands is essential (Rafiq-uz-Zaman, 2023). Together, all these studies give a conceptual basis to study the mismatch between ICT training and classroom implementation of ICTs among elementary teachers in Punjab, Pakistan. An in-depth empirical study in the context of teachers who receive ICT training, however, is needed to answer the question of how the digital technologies are embedded as a routine part of everyday learning in the classroom.

2.2 From Training to Classroom Use

Training is important, but not sufficient to ensure use (Ertmer, 1999; Ertmer et al., 2012). The most effective programmes included a combination of hands-on training and collaboration, and continued mentoring and institutional support, while one-off workshops had little impact on practice (Amemasor et al., 2025; Darling-Hammond et al., 2017). Access to devices, connectivity, and digital resources is also a necessity, as is often not the case in public schools, especially rural areas (Akram et al., 2022; Jamil et al., 2016; Zamir & Wang, 2023).

2.3 Professional Standards in Practice in Pakistan

Studies of Pakistani teachers suggest a gap between knowing the professional standards and practising them. Secondary teachers in Lahore showed some familiarity with the national standards but did not apply them efficiently in their classrooms, and there were gaps between their actual competencies and their perceptions of those competencies (Ullah et al., 2022). Whether a similar gap exists for ICT among elementary teachers, and whether it differs between groups of teachers, has received little attention.

2.4 The Present Study

The study addressed four questions:

RQ1. What level of ICT training, access and use do public elementary teachers report?

RQ2. Does this differ between urban and rural teachers?

RQ3. Does it differ between teachers in Lahore and Kasur districts?

RQ4. Does it differ between male and female teachers?

3. Method

3.1 Design and Participants

A cross sectional survey design was utilized. The study population included public elementary school teachers of Lahore and Kasur district of Punjab. Due to school closures during COVID-19 pandemic, a convenience sample was taken (Etikan et al., 2016); a total of 10 schools were selected in each district (5 urban and 5 rural in Lahore and 6 urban and 4 rural in Kasur) and teachers were approached via Assistant Education Officers and invited to participate in the study by filling the questionnaire online. The total number of the teachers who responded was 568, of which 302 were from Lahore and 266 were from Kasur, 339 were

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urban and 229 were rural, 254 were male and 314 were female.

3.2 Instrument

The ICT section of a self-developed questionnaire, made up of 30 items and based on the ICT standard of the national standards, covered three areas (Figure 1): the ICT training teachers had received (for example, "Was Microsoft Excel taught during ICT training?"), their access to digital resources (for example, "Do you have access to an e-library?"), and their use of ICT in teaching and record-keeping (for example, "Do you prepare your tests on a computer?"). Responses were given on a five-point scale from 1 (almost never) to 5 (almost always) (Joshi et al., 2015). Three experts in education reviewed the items, and the questionnaire was piloted with 30 elementary teachers outside the main sample. The pilot data showed high reliability: Cronbach's alpha, which shows how consistently a set of items measures the same thing (Tavakol & Dennick, 2011), was .91 for the ICT items and .87 for the questionnaire as a whole.

Figure 1

The Three Areas Covered by the ICT Section of the Questionnaire, With an Example Item for Each



Training received (14 items) → Access to resources (2 items) → Use in teaching & records (14 items)

Note. Example items: *"Was Microsoft Excel taught during ICT training?"; "Do you have access to an e-library?"; "Do you prepare your tests on a computer?"*

3.3 Procedure and Ethics

Permission was obtained from school heads and Assistant Education Officers before data collection. Teachers were informed of the purpose of the study, participated voluntarily, and were assured that their responses would remain anonymous and confidential and be used only for research.

3.4 Analysis

Each teacher's score was calculated as the mean of the 30 ICT items, so that scores sit on the original 1–5 scale. The overall level was compared with the scale midpoint (3). Group differences were tested with Welch's *t*-test (Delacre et al., 2017). For each comparison we report the 95% confidence interval of the difference and Cohen's *d* (Cohen, 1988). *p* values were adjusted for the three comparisons using the Holm (1979) method.

4. Results

4.1 Overall Level of ICT Training and Use

Teachers' overall ICT score was below the scale midpoint, $M = 2.79$, $SD = 0.83$, 95% CI [2.72, 2.86], $t(567) = -6.00$, $p < .001$, $d = 0.25$. On average, teachers reported that the ICT training and practices described in the questionnaire occurred less than "sometimes", pointing to limited preparation and use.

4.2 Differences Between Groups

Teachers in Lahore scored slightly higher than those in Kasur (2.85 vs 2.72), but the difference was not statistically significant, $t(556.7) = 1.89$, adjusted $p = .18$, $d = 0.16$ (Table 1; Figure 2). Urban and rural teachers scored almost identically (2.80 vs 2.78), as did female and male teachers (2.81 vs 2.76). All group means lay below the scale midpoint.

Table 1

ICT Training and Use by Locale, District, and Gender

Comparison	Group 1 *M* (*SD*)	Group 2 *M* (*SD*)	Difference [95% CI]	*t*	Adj. *p*	*d*

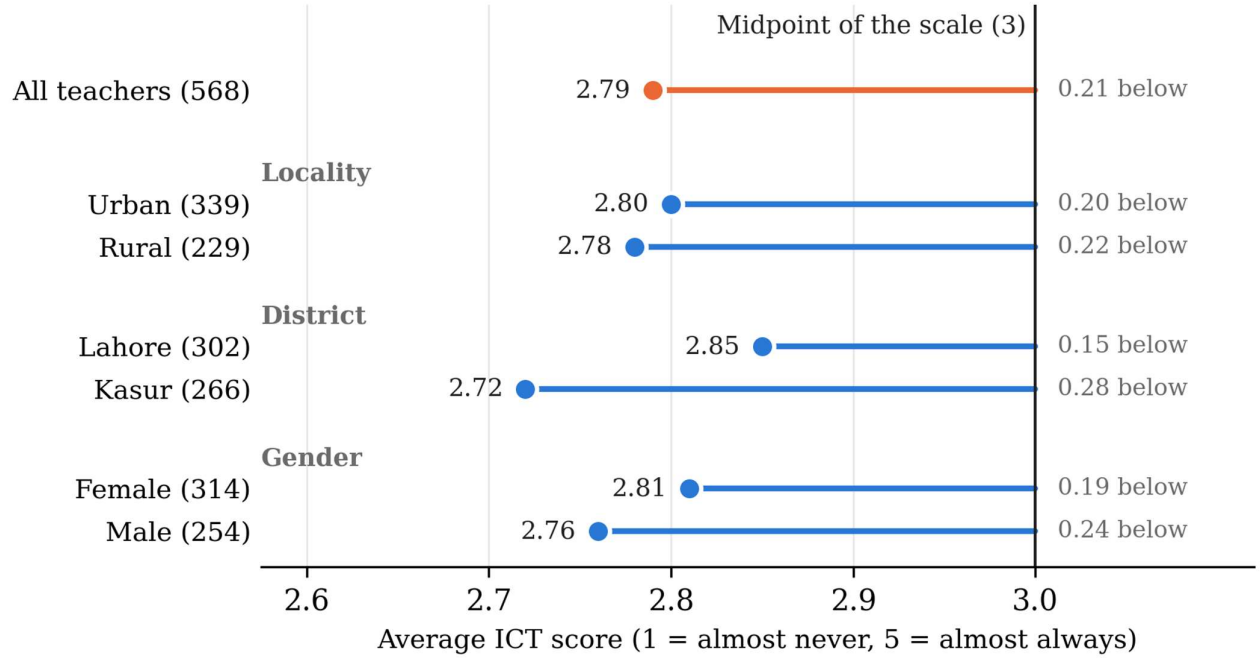
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Urban (339) vs rural (229)	2.80 (0.83)	2.78 (0.84)	0.01 [−0.13, 0.15]	0.15	.96	0.01
Lahore (302) vs Kasur (266)	2.85 (0.92)	2.72 (0.71)	0.13 [−0.01, 0.27]	1.89	.18	0.16
Female (314) vs male (254)	2.81 (0.77)	2.76 (0.91)	0.05 [−0.09, 0.19]	0.71	.96	0.06

Note. Scores range from 1 (almost never) to 5 (almost always). Welch's *t*-tests; *p* values are Holm-adjusted for three comparisons. *d* = Cohen's *d*. Group sizes are shown in brackets.

Figure 2

Average ICT Score by Group



Note. The scale midpoint is 3.

5. Discussion

5.1 Limited Trainingfa and Use

Elementary teachers' use and training scores were below the scale's midpoint, indicating low levels of training and use of ICT (Jamil et al., 2016; Saleem et al., 2019). For a great many, there was little training in common applications, limited access to digital resources and few were using ICT to prepare lessons, to assess pupils or to keep records. This is far from the expectations of the national standards (Ministry of Education, 2009) and international standards (UNESCO, 2018), and this is probably part of the reason why the transition to remote teaching during closures was so difficult for a large number of teachers in Pakistan (Noor et al., 2020; Zamir & Wang, 2023).

A lower score may be due to a lack of training, access and use, as these three areas have been combined for the measure. Findings from other contexts indicate that these two are connected; one cannot achieve change in practice without the other, and one cannot use equipment without the other. There is evidence from other contexts that they are interconnected: Training without access to the equipment is not likely to produce change in practice, and access without training will result in unused equipment (Amemasor et al., 2025; Ertmer, 1999; Hew & Brush, 2007).

5.2 A Shared Problem Across Groups

Perhaps most interesting is the similarity of the groups. The level of training and use of the ICTs was low for all teachers, including urban and rural, male and female, and teachers in the two districts, and none of

the differences was statistically significant. This indicates that poor preparation of teachers in ICT is a problem for all public elementary teachers and not just for a specific teacher in rural schools. This is in line with the evidence that the knowledge of teachers about the professional standards is yet to be translated into their classroom practices (Ullah et al., 2022).

5.3 Implications

Professional learning should not be limited to one- or two-day introduction of ICT for elementary teachers (Kennedy, 2016). Effective programmes integrate hands-on practice with follow-up support and mentoring activities and make the acquisition of new skills relevant to everyday activities of teachers including lesson planning, assessment and record-keeping (Amemasor et al., 2025; Darling-Hammond et al., 2017). Without the availability of computers, projectors and internet in schools, such training will have little impact (Jamil et al., 2016). Since low levels were found in every group, provision should be universal, reaching the urban and rural schools, as well as the urban and rural districts.

5.4 Limitations

This study was based on online self-reported data from teachers and a convenience sample (Etikan et al., 2016), during school closures, from two districts; less experienced teachers with less experience in ICT may have been less inclined to respond to an online survey, and the actual extent of ICT use may be significantly less. This questionnaire was developed for the purposes of this study and the question items for training, access and use were merged into one score and therefore examined together. Additional research might examine these areas individually, incorporate classroom observations, and encompass additional districts.

6. Conclusion

Limited training and little use of ICTs was reported by the public elementary teachers in Lahore and Kasur, with no significant difference between urban and rural schools, districts or genders. Securing the ICT expectations of the national standards will take time, sustained, practical training, which is tied into curriculum activities, and a reliable technology readily available in all schools.

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Statement of Data Availability

The corresponding author can provide the data used in this study upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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