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Equipping Future Educators: A Case-Based Evaluation of Pre-Service Teacher Training Programs in Khyber Pakhtunkhwa

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ABSTRACT

This study is pitched at building an understanding that how the teacher training programs in Khyber Pakhtunkhwa are preparing its primary school teachers to meet the primary schooling needs. For the same purpose, the study assessed the gap between pre-service teacher training programs and classroom needs in light of survey information to find guidance for policy. The study is targeting the most essential gaps to be included in pre-service teacher training programs that can enhance primary teachers' teaching capacity and resultantly could increase active learning of students at primary schooling level. Through a systematic literature review, the work went through systems and practices that operate around the world and what possible idealism is pursuable in Pakistan. This work went through multiple studies especially the ones conducted in Pakistan and likewise in other countries and identified some of the most thought provoking factors. The study adopts mixed methods and analyzes data qualitatively and quantitatively. Scientifically validated research instruments were utilized to assess in-service and pre-service primary school teachers, their trainers, their students, and pre-service teacher training centers in three main districts of Khyber Pakhtunkhwa. Survey data from the mentioned multiple respondents is collected using stratified random samples from Peshawar, Mardan, and Kohat districts. According to the findings, there is a measured gap between pre-service teacher training programs and classroom needs. This suggests a need to uplift technical information in training curricula and to enhance tech-skills of primary school teachers. The possible dividends of the using technology seem invisible. Teacher trainers seem to need more training. There is a need to set up instructional technology centers to lead the primary education department to efficiently use and integrate computing tools, systems and applications in the rapidly changing educational environment. These findings question the availability of funds to uplift training programs of primary school teachers but also signify implications for policy makers who should take the primary schooling of Khyber Pakhtunkhwa to a more modern and competitive level.

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INTRODUCTION

In many low-income countries, including Pakistan, the education system faces numerous challenges that hinder the development of human capital and the achievement of global sustainability goals. Among the most pressing issues is the quality of primary education, which is often constrained by inadequate teacher training, outdated curricula, and insufficient resources. The Sustainable Development Goal 4 (SDG 4) of the United Nations calls for ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all (UNESCO, 2020). To achieve this, countries like Pakistan must reform their teacher education systems to improve student outcomes and foster sustainable development.

Inadequate infrastructure, substandard facilities, and insufficiently trained teachers highlight the persistent neglect by successive governments and the shortcomings of an ineffective educational policy. Pre-service teaching training (PSTT) programs are deemed essential in delivering quality education to young children at elementary levels. In Pakistan, there appears to be a significant disconnect between the training of pre-service primary school teachers and students' learning achievements. Classroom needs have to be meticulously assessed before a teacher is trained to address the required needs. Pre-service teacher training (PSTT) is central to these reforms. However, in Pakistan, there exists a significant disconnect between teacher preparation programs and the specific needs of classrooms, particularly in primary education. This gap in training often leads to inadequate pedagogical approaches, which fail to address the complex educational needs of young learners. Darling-Hammond et al. (2017) argue that effective PSTT programs in low-income countries must focus on not only subject knowledge but also pedagogical skills, emotional development, and cultural sensitivity. Aligning teacher education programs with local needs and contexts is essential for fostering a conducive learning environment.

The global development agenda envisioned by United Nations for 2030 has now set the goal of quality education for the member states. Pakistan’s education policy will have to direct governmental machinery to achieve these goals in the forthcoming future. Undeniably, primary education reserves the foremost importance in the whole human development equation. Generally, it is perceived that education standards are poor in Pakistan. This relates to physical infrastructure, curriculum development, and teaching resources. The formal pre-service teaching programs aimed at producing manpower for educating young children at the primary level are observed to have serious short-comings. Classroom teaching requires a person to possess many things before even being considered for teaching. This is evident from the induction criteria of teaching institutions selecting candidates for elementary teaching around the world.

Pre-service teacher training (PSTT) is central to these reforms. However, in Pakistan, there exists a significant disconnect between teacher preparation programs and the specific needs of classrooms, particularly in primary education. This gap in training often leads to inadequate pedagogical approaches, which fail to address the complex educational needs of young learners. Darling-Hammond et al. (2017) argue that effective PSTT programs in low-income countries must focus on not only subject knowledge but also pedagogical skills, emotional development, and cultural sensitivity. Aligning teacher education programs with local needs and contexts is essential for fostering a conducive learning environment.

Research has demonstrated that global best practices in teacher training from countries such as Finland, South Korea, and Japan have led to significant improvements in educational outcomes (Cochran-Smith & Zeichner, 2020). By studying these models, Pakistan can gain insights into how to revamp its teacher education programs to meet both national and international standards. The adaptation of such models must consider local cultural, social, and economic contexts to ensure relevance and effectiveness.

Our public primary schools, which are usually resource constrained, have no other option than to depend on the abilities and aptitude of instructors to deliver in educating children better. Primary teachers are supposed to keep their pupils motivated and they also have to assume a major role in the personality improvement of his/her pupils. Our country in general and our province in particular has remained short of resources in addressing the education issue. Financial constraint has traditionally been quoted as a major constraint, but optimum utilization of available meager resources has not remained a priority. There has been a fresh intervention by the KP Government in allocating one-third of provincial budget on education. But still there are visible flaws in human resource management, research & development, curriculum development etc.

In addition, there is a growing body of research that highlights the importance of optimizing limited resources in resource-constrained environments (White & Reddy, 2022). While Pakistan continues to face financial constraints, particularly in public education, there is potential for significant improvement through efficient allocation of available resources, such as focusing on teacher capacity-building and improving curriculum quality. Through targeted educational policy reforms, Pakistan can make meaningful strides toward achieving SDG 4 and improving primary education quality across the nation.

According to Annual School Census 2021-22 of Khyber Pakhtunkhwa, there are 27,811 Government Schools in the settled districts out of which 194 are not even functional. These schools enroll 4.763 million children out of which 2.994 million are enrolled prep to Class-5. The total number of working teachers are 155,881 out of which 57,226 are female teachers. Teachers working at primary level are 77,448 out of which 29,000 are female teachers. These statistics show the significance of primary education in terms of government statistics.

Our world is changing and the new generation is looking to get trained for the future in light of swiftly changing technologies. Is our government primary schooling realizing this need and is it addressing it. This present study has looked into this problem by targeting the primary level PSTT needs of three districts of KP including Peshawar, Mardan, and Kohat. This study aims to explore the current state of PSTT programs in Khyber Pakhtunkhwa, Pakistan, assessing their alignment with classroom needs and identifying key constraints in pedagogical training. By analyzing these issues, the research will provide valuable insights into how Pakistan's teacher education system can be reformed to meet the challenges of the 21st century.

This study has the following objectives:

- To assess the existing gap between pre-service teacher training (PSTT) programs and actual classroom needs, with the aim of informing evidence-based policymaking for the design and implementation of PSTT programs.
- To identify essential pedagogical tools and instructional strategies that should be integrated into PSTT programs to enhance student learning outcomes at the primary and secondary education levels.
- To develop a validated checklist of critical teaching competencies and skills that are most urgently needed by pre-service teachers to effectively meet students' cognitive and developmental learning requirements.

Considering application of mixed methods these objectives are going to be achieved using the following set of research questions and hypotheses;

Research Questions

i. What pedagogical tools are currently underutilized or missing in PSTT programs but considered effective by experienced teachers?

ii. What are the perceived gaps between the content of current PSTT programs and the practical demands of primary and secondary classrooms?

iii. Can a reliable and valid checklist of essential teaching competencies be developed using expert consensus and empirical validation?

Research Hypotheses

i. There is a statistically significant gap between the competencies taught in PSTT programs and the skills required in real classroom settings.

ii. A lack of exposure to digital pedagogical tools during PSTT is a major barrier to effective classroom teaching.

iii. The use of a validated competencies checklist in PSTT improves pre-service teachers' preparedness and classroom effectiveness.

LITERATURE REVIEW

Pre-service teacher training plays a crucial role in shaping the instructional capacity and character development of children during their formative years. Pre-service teacher training (PSTT) is widely recognized as a cornerstone for effective educational delivery, especially at the foundational levels of primary and secondary education. It is during pre-service training that future educators gain theoretical knowledge, practical exposure, and pedagogical skills essential for shaping student learning outcomes. However, a persistent challenge in many developing countries, including Pakistan, is the apparent misalignment between PSTT programs and actual classroom needs. This literature review explores key studies, models, and practices in PSTT, with specific reference to their compliance with classroom requirements, effective pedagogical tools, and core teaching competencies needed in 21st-century classrooms.

One of the critical concerns raised by researchers is the disconnect between pre-service teacher education and real-time classroom practices. Ajmal et al. (2016) emphasized the under-utilization of student-centered approaches such as problem-based learning (PBL) in Pakistani PSTT programs. Although PBL is well-established in medical education, its application in teacher training remains scarce. The authors argue that training must evolve from theory-heavy delivery toward a practice-oriented framework. Ali et al. (2021) explored this theory-practice divide by evaluating how national PSTT curricula often fail to prepare trainees for contextual challenges such as multilingual classrooms, overcrowding, or lack of teaching aids. Kabilan et al. (2018) further emphasized that despite curriculum reforms, student teachers in South Asia are rarely prepared for critical thinking, differentiated instruction, or formative assessment—skills that are indispensable for modern classrooms. A systematic review by Darling-Hammond et al. (2017) identified coherence between coursework and field experiences as a core feature of effective PSTT. Their findings suggest that disjointed programs result in trainees feeling unprepared for real-world teaching complexities. Similar views are echoed in the work of Chaudhry and Ur Rehman (2020), who highlighted the inadequacy of PSTT programs in equipping teachers with classroom management and learner engagement strategies.

To meet contemporary learning standards, PSTT must incorporate modern pedagogical tools that enable teachers to adapt to diverse learning environments. Yang (2012) demonstrated that integrating critical thinking models into PSTT not only improves teacher cognition but also translates into improved student achievement. His proposed instructional model underlines the long-term benefit of developing metacognitive strategies in teacher education. In the Netherlands, Velthuis et al.(2014) explored how engaging pre-service teachers in curriculum reform and inquiry-based learning enhances their self-efficacy and instructional skills, particularly in Science, Technology, Engineering, Mathematics (STEM) fields. Similarly, Wright and Bolin (2019)

emphasized the role of inquiry-based instruction and reflective practices in developing professional judgment in novice teachers.

Shah and Aslam (2022) stress the urgent need for ICT integration into teacher education in Pakistan. They argue that digital literacy is no longer optional but a core teaching competency, especially after the learning disruptions caused by the COVID-19 pandemic. Their findings align with Reimers and Schleicher (2020), who proposed an international framework for future-oriented teacher competencies, emphasizing digital pedagogy, adaptability, and collaborative learning. A multi-country study by Evagorou et al. (2015) illustrated that across Finland, France, Cyprus, and England, the successful PSTT models integrate real-life teaching scenarios through case studies, microteaching, and co-teaching—all aimed at developing reflective, adaptive, and innovative practitioners.

Yang (2012) further explored how critical thinking skills and dispositions developed during teacher training transfer to classroom practice. His study proposed an instructional model that supports the personal and professional growth of pre-service teachers, highlighting the potential of critical thinking frameworks to enhance student learning outcomes. Similarly, Australia has seen a shift from a supervisory model to a coaching-based approach in its teacher education programs over the past decade, with greater emphasis on reflective practices and collaborative learning. Ambrosetti (2014) stressed the pivotal role of mentor teachers in facilitating authentic learning experiences during practicum placements. She underscored the need for clarity in assessment practices to avoid role confusion between mentor and mentee and to promote professional development through negotiated, classroom-based learning opportunities. In the Netherlands, Velthuis et al. (2014) examined how various elements of teacher education programs influence pre-service teachers' self-efficacy in science instruction. The authors recommended greater support during the transition to classroom responsibilities and suggested involving pre-service teachers in adapting traditional curricula into inquiry-based models, in collaboration with peers and mentors. Evagorou et al. (2015) compared pre-service training programs across Finland, England, Cyprus, and France, revealing shared challenges in sustaining continuous professional development (CPD). The study found that, across these systems, CPD was not compulsory and lacked structured career-long planning.

The shift in educational discourse from content delivery to competency-based teaching requires a reevaluation of the essential skills that PSTT should foster. Tardif (2001) proposed four foundational components: pedagogical content knowledge, classroom management, instructional adaptability, and reflective practice. These remain relevant today, but with growing complexity in classrooms, newer skills such as data-driven instruction, inclusion practices, and social-emotional learning have become crucial. Khan et al. (2023) explored reflective teaching as a driver for professional development and student achievement in Pakistani classrooms. Their findings support the inclusion of structured reflection journals, peer feedback, and performance reviews in PSTT programs. Rahim and Farooq (2024) highlighted the absence of inclusive education modules in PSTT programs in Pakistan, identifying it as a major shortcoming. As classrooms grow increasingly diverse in terms of learning needs, linguistic backgrounds, and socio-economic statuses, teachers must be prepared with inclusive teaching practices. Loughran (2019) argued for embedding metacognition, resilience, and formative assessment literacy as standard features of

PSTT curricula. These skills not only support academic success but also empower teachers to design instruction tailored to individual student profiles. The OECD (2021) report on future-ready teaching competencies recommends a baseline checklist for teacher preparation programs that includes digital and data literacy, adaptive instruction and personalization, socio-emotional support and well-being, assessment for learning, cultural and linguistic responsiveness.

These frameworks can inform the development of a localized, skill-based checklist tailored to Pakistan's education landscape. The literature strongly indicates that the effectiveness of pre-service teacher training hinges on its ability to reflect classroom realities, equip teachers with adaptable pedagogical tools, and foster core teaching competencies. For Pakistan, bridging the theory-practice divide, updating curricula with 21st-century skills, and integrating context-specific pedagogies remain pressing imperatives. Addressing these areas through a revised policy and practical reforms will ensure that PSTT programs genuinely prepare educators to meet the evolving learning needs of primary and secondary school students.

RESEARCH METHODOLOGY

This research employs a mixed-method approach, combining qualitative and quantitative data collection strategies to comprehensively assess the gaps in pre-service teacher training programs (PSTT) and their alignment with classroom needs. The qualitative phase precedes the quantitative one, starting with two focus group discussions (FGDs)—one with in-service/aspiring teachers and the other with primary-level students. These discussions provide essential insights that inform the design of the survey questionnaires. In the subsequent phase, the study shifts to a more structured quantitative design, using surveys to gather data from key stakeholders: PSTT facilities, prospective teachers, and students. The survey instruments, designed to measure training needs, satisfaction, and skill development, undergo a thorough pilot-testing phase to ensure validity and reliability. After refinement, the questionnaires are deployed to a sample of stakeholders, including teacher trainers, PSTT candidates, and students, across three districts: Peshawar, Mardan, and Kohat.

The thematic analysis of qualitative data from the focus groups and interviews provides a deeper understanding of the needs, perceptions, and challenges within PSTT programs. NVivo software aids in organizing and categorizing data to uncover recurring themes such as 'teacher training programs,' 'development,' 'learning,' and 'primary school teachers. 20 teachers who were part of pre-service teacher training programs were interviewed. Their interviews were transcribed. Data coding and familiarization was done and themes generated. They were reviewed, defined and named. Data from surveys help test hypotheses and provide measurable insights into the effectiveness of PSTT programs, which are then cross-analyzed for statistical significance using descriptive and inferential techniques.

The mixed-method approach employed in this study has several limitations. Resource constraints, including time and financial limitations, influenced the sampling design and the ability to collect a larger sample, which may reduce the generalizability of the findings across the entire region or country. Sampling bias could also be present, as the reliance on voluntary participation may lead to differences in views between those who chose to participate and those who did not.

Respondent bias is another concern, as teachers and students may have a tendency to underreport dissatisfaction or overemphasize positive aspects of their training due to social desirability. Lastly, while the survey questionnaires were pilot-tested, tool limitations still exist, as the design and wording of the instruments may present issues in terms of clarity or relevance for all respondents, which could affect the overall validity of the responses.

The qualitative portion of the study began with two focus group discussions (FGDs) held with in-service teachers and primary school students. The purpose of these discussions was to gain preliminary insights into the real-world challenges and perceptions of teachers and students regarding PSTT programs. The transcripts of these FGDs were analyzed using NVivo software, a qualitative data analysis tool that facilitates coding and theme identification. Thematic analysis was applied to the data, identifying key themes that align with the research objectives, such as 'teacher training programs,' 'learning outcomes,' and 'teaching effectiveness.' Word cloud and tree analysis further refine these themes, helping to clarify the most prevalent issues within the training programs. These findings were supposed to be explored further and therefore the survey instruments included important open-ended questions on major limitations of training programs.

For the quantitative phase, survey instruments were designed based on theoretical framework and operationalization of main deduced variables. The questionnaires were tailored to the socio-economic context of the study and were piloted before being finalized. These instruments assessed training needs, satisfaction levels, and skills development from the perspective of PSTT candidates, teacher trainers, and curriculum developers. A stratified sampling method was employed to select a balanced representation of respondents across three districts: Peshawar, Mardan, and Kohat. Each district was assigned a sample size of approximately 90 respondents from each of the three stakeholder groups (pre-service teachers, teacher educators, and curriculum makers). The final sample comprised a total of 270 respondents for these groups. A separate sample of 360 in-service teachers was also surveyed, with 120 respondents from each district. Surveyors are trained to collect both primary and secondary data, ensuring that they are well-prepared to meet the study's data collection goals. Data collection was executed simultaneously across the three districts, and rigorous efforts are made to ensure the accuracy and integrity of the data.

For the quantitative data, both descriptive and inferential statistical methods are employed. Descriptive statistics summarize the data, providing a clear overview of respondent characteristics and the distribution of key variables. Inferential statistics, including cross-tabulations and hypothesis testing, help draw conclusions about the relationship between different variables, such as training needs and satisfaction levels.

According to Annual School Census 2021-22, if we look at the number of Government primary schools; there are 13404 schools for boys and 8717 schools for girls in Khyber Pakhtunkhwa. Considering our the chosen districts of this study, the number of Government Primary Schools are reported in Table 1;

Table 1

District	Boys	Girls	Total
Peshawar	594	459	1053
Mardan	805	621	1426
Kohat	371	295	666

Similarly, we know the population of in-service primary school teachers from Table 2 for these districts;

Table 2

District	Male Teachers	Female Teachers	Total
Peshawar	3525	2809	6334
Mardan	3700	2774	6474
Kohat	1512	1010	2522

For these schools, the following population of gross enrollment in primary schools could be identified using Table 3.

Table 3

District	Boys	Girls	Total
Peshawar	157820	143742	301562
Mardan	141284	137910	279194
Kohat	59872	48406	108278

To conduct surveys a simple sample design was put to work. To identify in-service and pre-service teachers, their trainers, and curriculum makers in the context of stratified random sampling the obtainable sample was divided into three strata: Peshawar, Kohat, Mardan. For this study, the sample can be estimated by minimum sample size needed for the measurement in the accuracy for the proportion by taking the standard deviation at 95%, confidence interval at l.96 (Cochran, 2007). The formula is:

$$n = Z^2\ (P)(1-P)/C^2$$

Where:

z = standard normal deviation set at 95% confidence level
p = percentage picking a choice or response
c = confidence interval

$$n = 1.96^2\ (0.2)(1-0.2)/0.05^2\ n = 38416(0.2)(1-0.2)/0.0025\ n = 245.8$$ =246

The total number was then divided in to 3 districts that gave the result of 82 respondents from each district which was rounded off to 90 respondents from each district. Hence we get sampling units to be approached for gathering data reported in Table 4.

Table 4

Pre-Service Teachers Sample, Teacher Educators Sample and Curriculum Makers Sample

	246 =>246/3= 82≅90			
District	Sampling			Total
	Pre-Service Teachers Sample	Trainers Sample	Curriculum Makers	Sample
Peshawar	30	30	30	90
Mardan	30	30	30	90
Kohat	30	30	30	90
Grand Total	90	90	90	270

Keeping in view the financial and time constraints, Yamane, (1967) formula was employed for In-service teachers. Result was 353; the total number was then divided in to 3 districts that give the result of 117 respondents from each district which was rounded off to 120 respondents from each district. Hence a final list of respondents from each district is shown in Table 5:

Table 5

District	Sampling	Total
Total	353>353/3= 11766 ≅ 120	360
Peshawar	117≅ 120	120
Mardan	117≅ 120	120
Kohat	117≅ 120	120
Grand Total		360 Respondents

Surveyors are selected and trained for data collection from Peshawar, Mardan and Kohat districts. The results of pilot study were satisfactory hence the surveyors were directed to collect the data. The whole project team worked diligently in achievement of weekly targets that were set by a monthly meeting for which all formal record is kept.

To test the proposed hypotheses, a mixed-methods approach was adopted, combining quantitative survey analysis and quasi-experimental design. The study focused on understanding the alignment between pre-service teacher training (PSTT) program content and classroom realities, with particular emphasis on competency gaps, digital tool exposure, and the effectiveness of a validated competencies checklist.

For the first hypothesis, which posits a statistically significant gap between the competencies taught in PSTT programs and the skills required in real classroom settings, a structured survey instrument was administered to both in-service teachers and teacher educators. Respondents were asked to rate each identified teaching competency on two dimensions: (1) the extent of its coverage in PSTT programs, and (2) its perceived importance in actual classroom teaching. A paired samples t-test was conducted to determine whether significant differences existed between these two sets of ratings, indicating a measurable gap.

To test the second hypothesis, concerning the role of digital pedagogical tools, a correlational design was employed. Pre-service and in-service teachers were surveyed to assess their exposure to digital tools during training (e.g., frequency of usage, training sessions attended) and their self-reported effectiveness in using these tools in real classroom contexts. A Pearson correlation and linear regression analysis were conducted to examine the strength and direction of the relationship between digital tool exposure and perceived classroom effectiveness.

For the third hypothesis, which suggests that the use of a validated competencies checklist in PSTT improves pre-service teachers' preparedness and classroom effectiveness, a quasi-experimental design was used. Two groups of pre-service teachers were compared: one group trained with the support of a validated competencies checklist (intervention group), and another trained under the existing PSTT framework (control group). Measures of preparedness and classroom performance were gathered through self-assessments and supervisor evaluations. An independent samples t-test and multivariate analysis of variance (MANOVA) were applied to assess the impact of the checklist on the outcome variables.

This multi-layered methodology allowed for robust triangulation of findings and provided empirical support for theory development and practical recommendations.

RESULTS AND DISCUSSION

The issue of technology integration in teacher education programs is one that can no longer be ignored. Most respondents both in-service and pre-service, in their reflections on the current state of Teacher Education programs, were vocal about the glaring gap between what is being taught in theory and what is actually needed to equip primary school teachers with the tools to succeed in a digital age. While many acknowledged the importance of improving course content, there was a widespread consensus that one of the most pressing needs is the inclusion of technology and practical application training. This is not merely a suggestion but a necessity if we are to ensure that primary school teachers are prepared to engage effectively with today's learners.

Based on the qualitative insights gathered through in-depth interviews with in-service teachers, pre-service teachers, and their trainers, a new theoretical framework—Competency Relevance Alignment Theory (CRAT)—has emerged. This theory explains the relationship between the content of Pre-Service Teacher Training (PSTT) programs and their practical relevance in addressing the actual challenges faced in primary and secondary classrooms. CRAT posits that the effectiveness of PSTT is significantly influenced by the degree of alignment between the competencies taught during training and the contextual demands of the classroom environment. The theory highlights that a misalignment between training content and real-world needs results in skill gaps, reduced teacher confidence, and suboptimal student learning outcomes. Moreover, it underscores the critical role of underutilized yet effective pedagogical tools—such as formative assessment strategies, technology integration, and differentiated instruction—in bridging this gap. CRAT also emphasizes the importance of stakeholder-informed training content, where expert consensus contributes to the development of a validated and dynamic checklist of essential teaching competencies. This theory offers a practical lens for policymakers, curriculum designers, and teacher educators to reimagine PSTT programs as responsive, evidence-based systems grounded in classroom realities.

Despite the theoretical richness of the curriculum, which is often grounded in traditional educational psychology, classroom management, and subject-specific knowledge, it falls short in addressing the real-world demands placed on teachers today. Many teacher trainers themselves, although rich in theoretical knowledge, are not equipped with the technological competencies required to teach new methods, manage classrooms using digital tools, or integrate online resources effectively. This results in a situation where not only are the prospective teachers inadequately prepared, but the trainers themselves are not role models for the use of technology in the classroom. Without the necessary tech training for these educators, primary school students are deprived of the opportunity to learn in a dynamic, modernized environment.

A clear example of this technological divide is seen in the lack of modern instructional technology in teaching practices, particularly in the use of multimedia tools, online resources, and collaborative platforms. Respondents were adamant that the integration of ICTs, media literacy, and computer technology should not just be an afterthought but a core component of the curriculum. Many in-service teachers were concerned that the current system does not sufficiently focus on these areas, thus putting both teachers and students at a disadvantage. In a world where digital tools play an integral role in every aspect of education, this lack of focus on technological fluency in teacher training is a significant barrier to the progress of primary education.

The limitations of the program are especially evident when considering the insufficiency of practicum opportunities. While teacher candidates generally felt that practicum activities helped improve their skills, they were quick to point out that the lack of integration with real classroom environments and technology-driven teaching was a major shortcoming. Respondents repeatedly called for the provision of tablets, internet facilities, and AV aids to aid their learning. They argued that these resources are not just nice-to-haves but essential tools for creating an effective learning environment. Tablets with integrated educational content could, for instance, serve as an invaluable resource, offering teachers immediate access to pronunciation guides, dictionaries, and multimedia educational tools that can enrich their teaching.

Further exacerbating the issue, many respondents expressed dissatisfaction with the quality and frequency of training on how to apply modern technologies in the classroom. This lack of training means that even when technological resources are available, teachers are often unprepared to use them effectively, missing out on the potential to engage students in meaningful ways. This issue is compounded by the weak infrastructure, lack of internet access, and insufficient government facilitation in schools and teacher training institutions.

The critique of teacher education programs in terms of technology use reflects a larger systemic issue. Government bodies and educational institutions must recognize that teacher training programs need to adapt to the evolving digital landscape. Teachers are not just instructors; they are facilitators of learning, and in today's world, that means they must be adept at using technology to foster an engaging, interactive, and effective learning environment. Without a concerted effort to integrate technology into every aspect of teacher education—from content design to practicum implementation—primary education will continue to lag behind in its ability to meet the needs of 21st-century learners.

A key concern emerging from the study was voiced not only by teacher candidates and trainers but also by primary school children aged 7 to 10—both boys and girls—who participated in the survey and shared valuable insights about the limitations of learning through technology. These Gen Alpha learners, who are growing up in a fast-paced digital world, expressed frustration over the lack of engaging, interactive tools in their classrooms. Many pointed out that online games, quizzes, and reading activities available through phones or tablets were either outdated, repetitive, or not aligned with their learning needs. They often felt that while such tools held potential, they were poorly implemented and rarely integrated into daily classroom practices. This sparked a wider debate around the generation gap between these digital-native children and their teachers, many of whom were trained in a time when technology was not a core part of education. The children noted that their teachers struggled to operate even basic digital tools and could not support them in navigating learning apps or interactive platforms. This disconnect highlights a crucial issue: while Gen Alpha thrives in environments enriched with technology, their educators are not sufficiently equipped to guide them. As one child said, "We want to play games that teach us, but our teacher says it's not in the book." This simple remark reflects a deeper systemic flaw—the inability of teacher training programs to prepare educators for the digital demands of modern classrooms. As such, the debate brings to light not only the limitations of technology use in primary education but also the urgent need for a tech-savvy teaching force that understands the learning behaviors of the current generation.

While the theoretical foundations of teacher education remain important, the overwhelming consensus among respondents is that the lack of technological integration in teacher training is a significant limitation. This not only hampers the effectiveness of teachers but also directly impacts the learning outcomes of primary school students. To address this, immediate action must be taken to ensure that teachers are equipped with the skills and tools necessary to teach in a technology-driven world. Training in advanced learning technologies, digital literacy, and the effective use of ICTs should no longer be optional—they must be foundational components of teacher education programs.

The study has used the reliability to check the reliability of the questionnaire used for the data collection. The test has included the interrelatedness of the items taken in the questionnaire. The rule of the thumb suggests that the coefficient value of 0.07 or above is acceptable. The study has used the test of reliability to re-calculated or analyze the internal consistency. Cronbach's alpha results are shown in Table 6.

Table 6

Factors	Items	Cronbach's α
Teaching Skill	41	0.96
Skills for Future	13	0.87
Class Management	10	0.70
Course Management	14	0.83
Professional Practice	5	0.84
Composure	10	0.89
Technology Use	8	0.90

The study has also evaluated the reliability of scale if item deleted option to check the item wise reliability of the items included in the questionnaire and also to point the item which is not compatible with the study objective and can affect the internal consistency. The findings argued that the items included have supported the internal consistency and found reliable for every dimension. The findings of item wise reliability showed the reliable results and concluded the internal consistency.

The sample teachers used in the preparing of data collection tools, for teaching. The questionnaire was designed on seven parts. The reliability and validity of the items were evaluated in the process of data collection by Cronbach's alpha and also in the pilot data. The construct validity was checked using the main data obtained from 584 participants. The study used the factor analysis in the pilot data analysis on the exploratory to confirm the underlying dimensions; the study has conducted the principle component analysis

The normality of sample size has been estimated before going to use the principle component analysis (PCA) for the purpose to check the suitability of data analysis the study has used the concept of Skewness and Kurtosis which has accepted range from +3 to -3 (Field, 2009). The concept of box plot and histograms can be used to check the existence of no outlier and normality. The sample of present study i.e 584/106 = 5 which can be considered as enough as following the literature (MacCallum et al, 1999).

Table 7

Factor Analysis	KMU and Bartlett's Test
Kaisor's Meyer Olkin Measure of Sampling Adequacy	920

Bartlett's Test of Sphericity	Approx	Chi-Square	3487148
	Df		4560
	Sig		000

Table 7 is the result of KMO and Bartlett‘s test using to measure the distribution of values and found that the values are higher than the accepted value 60 i.e. 920 and it is acceptable. The findings of Bartlett‘s test were found as 000 which shows as the significant value for the sphericity. The results argued that the presence of seven factors with higher eigen values than 1 were found 675 percent of the total variance.

Table 8

Factors	Items	Cronbach’s	Total (EFA	KMO	Bartlett’s	Variance
Teaching Skills	4	0	1	9	00	2040
Skills for Future	1	0	1	9	00	3085
Class Management	1	0	1	9	00	3962
Course Management	1	0	1	9	00	4759
Professional Practice	5	0	1	9	00	5493
Composure	1	0	1	9	00	6161
Technology use	8	0	1	9	00	6748

Table 8 shows that the statistics of KMO test is above 0.6 while the result of Bartlett‘s test is less than 0.05 which is the significant range for the acceptable model. The findings argued that the conditions for the assumption of EFA have been completed (Bartlett, 1954 and Kaiser, 1974). The values of alpha for the overall reliability were found 0.96 which have been found more than the standard proposed by George and Mallory (2003) for the internal consistency. The findings argued that the factors included were found reliable.

The three hypotheses were tested and it is found that there exists a clear and statistically significant mismatch between what is taught in PSTT programs and what is required in real classroom settings. This gap underscores the urgent need for curriculum reforms that are responsive to the practical demands of primary and secondary education. Limited exposure to digital pedagogical tools during PSTT significantly hinders teachers' ability to integrate technology effectively in the classroom. Strengthening digital literacy in teacher training is essential for improving instructional quality in modern educational environments. The use of a validated competencies checklist in PSTT significantly enhances pre-service teachers’ preparedness and classroom performance. Structured guidance on essential teaching skills leads to more confident, capable, and effective new educators.

CONCLUSION

Considering the research objectives of this work, the following conclusions could be safely drawn. The work was trying to assess the existing gap between pre-service teacher training (PSTT) programs and actual classroom needs, with the aim of informing evidence-based policymaking for the design and implementation of PSTT programs. The findings confirm a substantial disconnect between the structure and content of current PSTT programs and the practical demands of classroom teaching. Many teacher candidates complete their training without adequate preparation in behavior management, communication with stakeholders, and execution of inclusive practices. This gap appears to stem from a lack of cohesive policy frameworks and insufficient integration of evidence-based classroom strategies. These deficiencies call for urgent curriculum reform and a more policy-driven approach to align PSTT with real classroom expectations.

The research was also working to identify essential pedagogical tools and instructional strategies that should be integrated into PSTT programs to enhance student learning outcomes at the primary and secondary education levels. Essential pedagogical tools such as behavior management strategies, inclusive teaching methods, and stakeholder communication practices are either underrepresented or superficially addressed in existing PSTT curricula. Teacher candidates lack exposure to active, practice-based learning methods like role-play, simulations, case studies, and supervised interaction in real school settings. These tools are critical not only for effective student engagement but also for fostering collaboration and adaptability among novice teachers.

PSTT programs must incorporate such pedagogical techniques to build practical competency alongside theoretical understanding. The final objective of the research was to develop a validated checklist of critical teaching competencies and skills that are most urgently needed by pre-service teachers to effectively meet students' cognitive and developmental learning requirements. The research highlights the urgent need for a structured framework or checklist of essential teaching competencies, including classroom management, inclusive education strategies, administrative responsibilities, and communication with parents and colleagues. Despite covering certain theoretical aspects, current programs fall short in providing opportunities to practice and internalize these competencies. A comprehensive and context-relevant competency checklist could serve as a practical guide for curriculum developers, mentors, and policy makers to better align training content with classroom realities.

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