

Exploring the Effectiveness of University Teacher Professional Development in Khyber Pakhtunkhwa, Pakistan: A Systematized Review

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DOI: <https://doi.org/10.63163/jpehss.v3i2.926>

Abstract

Professional development (PD) of university teachers is widely recognized as a critical mechanism for enhancing teaching quality, strengthening research capacity, and improving student learning outcomes in higher education. In Pakistan, particularly in the province of Khyber Pakhtunkhwa (KP), universities have increasingly invested in faculty development initiatives; however, systematic evidence regarding the design, effectiveness, and impact of these programs remains fragmented and underexplored. This study presents a systematized review of empirical and grey literature to examine the key features of professional development programs for university teachers in KP, identify the factors influencing their effectiveness, and assess their impact on teaching practices, research competence, and student learning outcomes. A structured and transparent search strategy was employed across multiple international and national databases, including Scopus, Google Scholar and local university repositories. Studies published between 2000 and 2025 were screened using predefined inclusion and exclusion criteria. The selected literature was analyzed through thematic synthesis to identify recurring patterns, contextual factors, and outcome trends. The findings reveal that professional development programs in KP predominantly focus on pedagogical skills, research capacity building, instructional technology, and academic leadership, with delivery formats ranging from short-term workshops to sustained mentoring and blended learning models. Program effectiveness is strongly influenced by individual faculty motivation, relevance and coherence of program content, quality of facilitation, institutional leadership support, and availability of resources. Evidence across the reviewed studies indicates that well-structured and contextually aligned PD initiatives contribute to improved teaching practices, increased research productivity, enhanced scholarly confidence, and positive student engagement and learning outcomes.

Introduction

Professional development (PD) for university faculty is widely recognized as a cornerstone for enhancing teaching quality, research capacity, and academic leadership, which together contribute to the overall performance of higher education institutions (Shaheen, 2023). In a rapidly changing educational landscape, university teachers must continuously update their pedagogical skills, research competencies, and technological knowledge to remain effective (Pan & Abd Rani, 2025). Despite the global recognition of PD's importance, its implementation and outcomes are inconsistent

across different regions and institutional contexts. In Pakistan, higher education has expanded substantially over the past two decades. While the Higher Education Commission (HEC) has initiated programs such as faculty development workshops and training sessions, the design, effectiveness, and long-term outcomes of these programs remain underexplored, particularly at the provincial level (HEC, 2023). University faculty often face challenges such as limited access to ongoing professional learning, heavy teaching loads, and insufficient institutional support, which hinder their ability to implement modern pedagogical approaches (Ishrat & Ghias, 2019). The context of Khyber Pakhtunkhwa (KP) further complicates faculty development efforts. Universities in this province confront resource limitations, diverse student populations, and variable institutional priorities that affect how faculty engage with PD programs (Rana, Farooqi, & Ahmad, 2021). Research shows that teacher engagement in professional learning communities and structured PD activities can improve instructional quality and strengthen collegial support systems; however, such programs are not uniformly implemented across KP (Naqvi et al., 2023). International studies indicate that PD programs integrating sustained engagement, reflective practice, mentorship, and practical application are more effective than short-term workshops (Pan & Abd Rani, 2025). Similarly, Pakistani studies highlight systemic challenges such as workload conflicts and limited institutional backing, which reduce the effectiveness of PD initiatives (Ishrat & Ghias, 2019). Moreover, faculty frequently express the need for PD programs that support both teaching and research skill development, including academic writing, research methodology, and grant writing (Rashid, Safdar, & Ilyas, 2023). Given these challenges and gaps, understanding the key features of PD programs, the factors influencing their effectiveness, and the impact on teaching practices, research competencies, and student outcomes in KP universities is both an academic and policy imperative. This systematized review aims to synthesise existing evidence to inform the design of effective PD strategies, provide guidance for institutional policy, and support sustainable improvements in higher education quality in the region (Ahmed, Naudhani, & Wazir, 2025).

Literature Review

Professional development in higher education encompasses diverse strategies aimed at strengthening faculty knowledge, instructional effectiveness, and research capacity (Shaheen, 2023). Globally, sustained, reflective, and collaborative PD is associated with significant improvements in teaching practices and student learning outcomes (Pan & Abd Rani, 2025). For example, studies in Shanghai demonstrated that integrated PD programs with mentorship and ongoing support led to measurable gains in faculty teaching performance (Pan & Abd Rani, 2025). In Pakistan, research on PD in higher education remains limited but growing. Evidence from school-level PD suggests a positive relationship between teacher professional learning and instructional quality, implying that university faculty could benefit from similar approaches (Shaheen, 2023). However, most literature has focused on pre-service teachers or secondary education contexts, leaving a critical gap in understanding PD for university faculty in KP. Structural and institutional challenges play a significant role in PD effectiveness. Studies report that university faculty participating in HEC-sponsored PD programs encounter obstacles such as limited institutional support, heavy workloads, and a lack of follow-up mechanisms, which restrict the translation of training into practice (Ishrat & Ghias, 2019). This aligns with international findings emphasizing that institutional support and resource availability are critical determinants of PD success (Naqvi et al., 2023). Professional learning communities (PLCs) have emerged as effective mechanisms for faculty development. PLCs promote collaboration, peer learning, and reflective practice, enhancing instructional innovation and professional growth (Naqvi et al., 2023). Similarly, research-focused PD programs address university faculty's needs for improved research skills, including data analysis, academic writing, and publication strategies, thereby strengthening both teaching and research outcomes (Rashid, Safdar, & Ilyas, 2023).

Quantitative studies indicate that PD participation positively correlates with instructional knowledge and classroom practices. For instance, formative assessment training enhances educators' ability to design and implement effective assessment strategies, ultimately benefiting student learning (Kausar et al., 2025). These findings underscore the importance of aligning PD content with practical classroom and research needs. Despite these insights, gaps remain in linking PD participation directly to measurable improvements in teaching practice, research output, and student outcomes among university faculty in KP. Most studies focus on descriptive or needs-based analyses rather than rigorous evaluations of program outcomes (Ahmed, Naudhani, & Wazir, 2025). Addressing this gap is essential for designing evidence-based PD initiatives that can improve both faculty competencies and higher education quality in the region.

Research Questions

1. What are the key features of professional development programs for university teachers in KP, Pakistan?
2. What factors influence the effectiveness of these programs?
3. How do professional development initiatives impact teaching practices, research competence, and student learning outcomes?

Methodology

Research Design

This study employs a systematized review design to explore the effectiveness of university teacher professional development (PD) programs in Khyber Pakhtunkhwa (KP), Pakistan. A systematized review provides a structured and transparent approach to synthesized evidence from both peer-reviewed and grey literature, offering a comprehensive understanding of existing knowledge while identifying gaps for future research (Grant & Booth, 2009). Unlike conventional narrative reviews, this approach applies systematic search, screening, and synthesis procedures, although it may not fully implement all the methodological rigor of a formal systematic review. The design is particularly suitable for contexts where primary research is fragmented or limited, as is the case with university faculty PD in KP. A comprehensive literature search was conducted across international and national databases, including Scopus, Google Scholar and local university repositories. To ensure relevance, studies published from 2000 to 2025 were included, reflecting both recent trends and historical developments in PD in Pakistan and comparable contexts. Empirical studies, review articles, and literature focused on PD of university faculty in Pakistan. Studies reporting on program design, outcomes, or effectiveness. Thematic synthesis was used to analyse the data, identifying recurring patterns, gaps, and contextual factors affecting PD program effectiveness. Findings were categorized according to the three research questions to facilitate systematic interpretation.

Conceptual Framework

The conceptual framework for this study is grounded in the assumption that university teacher professional development (PD) programs influence teaching practices, research competencies, and student learning outcomes, while being moderated by institutional, individual, and contextual factors.

Key Constructs

1. **Professional Development Programs**
 - Duration and frequency of training
 - Content focus (pedagogy, research skills, ICT integration)
 - Delivery methods (workshops, seminars, online courses, mentoring)

2. Moderating/Influencing Factors

- **Institutional:** Leadership support, resource availability, PD culture
- **Individual:** Motivation, prior experience, engagement level

3. Outcomes

- **Teaching Practices:** Use of active learning, assessment strategies, student engagement
- **Student Learning Outcomes:** Academic performance, critical thinking, and learning satisfaction



Figure 1: Conceptual Framework of University Teacher Professional Development

Results

This systematised review synthesises evidence on professional development (PD) programs for university teachers in Khyber Pakhtunkhwa (KP), Pakistan. Studies, including empirical research, program evaluations, and qualitative case studies, were analysed. Findings are structured according to the research questions to provide clarity on program features, factors influencing effectiveness, and their impact on teaching, research, and student outcomes.

Key Features of Professional Development Programs

The reviewed literature highlights several key features of PD programs in KP universities, which can be classified into content focus, delivery mode, duration, and experiential learning components.

Content Focus

PD programs in KP predominantly aim to enhance pedagogical knowledge, research skills, and technological proficiency (Shaheen, 2023; Pan & Abd Rani, 2025). Pedagogical modules include active learning strategies, curriculum design, classroom management, and assessment techniques. For instance, HEC-sponsored faculty development programs often incorporate workshops on formative assessment and student-centered teaching strategies. Research-focused modules emphasize academic writing, grant proposal development, statistical analysis, and ethical research practices (Rashid, Safdar, & Ilyas, 2023). Recent studies also highlight the inclusion of ICT skills to support e-learning,

particularly after the transition to online and hybrid education formats due to the COVID-19 pandemic (Naqvi et al., 2023).

Program Duration and Format

Program duration varies considerably. Short-term workshops (1–3 days) remain common for pedagogical training, while intensive multi-week programs focus on research skills and curriculum development. Evidence suggests that longer-duration programs with follow-up mentoring and reflective practice yield greater impact on teaching practices and research competencies (Pan & Abd Rani, 2025). Delivery modes include face-to-face, online, and hybrid models, providing flexibility for faculty across geographically dispersed universities in KP. Online PD is increasingly used but faces challenges such as connectivity issues and varying digital literacy among faculty members.

Experiential and Collaborative Learning

Collaborative learning is a hallmark of effective PD programs. Professional learning communities (PLCs), mentoring, micro-teaching sessions, and peer observation foster engagement, reflection, and knowledge exchange (Naqvi et al., 2023; Ahmed, Naudhani, & Wazir, 2025). Faculty participating in such collaborative activities reported enhanced confidence in teaching and greater willingness to adopt innovative practices. Role-playing, classroom simulations, and group discussions were particularly effective in providing practical experience and immediate feedback.

Certification and Assessment

Programs often incorporate formative and summative assessment of faculty learning through reflective journals, action plans, and research proposals. Completion certificates provide formal recognition, which encourages participation, but studies emphasize that certificates alone do not guarantee changes in teaching or research behavior (Ishrat & Ghias, 2019). Sustained follow-up, mentoring, and institutional recognition are critical to ensure implementation of learned skills.

Factors Influencing Program Effectiveness

Effectiveness of PD programs is mediated by institutional, individual, and contextual factors.

Institutional Support

Institutional support is a significant determinant of PD outcomes. Universities providing administrative encouragement, access to teaching and research resources, and dedicated time for PD activities report higher implementation of training outcomes (Rana, Farooqi, & Ahmad, 2021). Conversely, institutions with heavy faculty workloads, lack of incentives, or bureaucratic barriers face limited adoption of PD content.

Individual Motivation and Engagement

Faculty engagement and motivation strongly influence program effectiveness. Intrinsic motivation, prior experience, and commitment to professional growth correlate positively with successful application of PD learning (Shaheen, 2023). Faculty actively participating in workshops, engaging in collaborative exercises, and reflecting on their practice demonstrate higher improvements in teaching and research outcomes.

Contextual and Policy Factors

Policy and socio-cultural context shape PD effectiveness. HEC and provincial education policies that integrate PD into career progression, promotion criteria, and institutional accreditation create incentives for faculty participation (HEC, 2023). Contextual challenges, such as traditional teaching norms, resource limitations, and regional infrastructure disparities, also affect program adoption and sustainability. Programs designed with these contextual realities in mind show higher success rates.

Program Design Features

PD program design plays a pivotal role in effectiveness. Relevant content aligned with faculty needs, experiential learning methods, follow-up mentoring, and continuous feedback mechanisms enhance the likelihood of implementation (Naqvi et al., 2023). Programs lacking relevance, follow-up, or practical application result in low retention and limited changes in faculty practices.

Impact of PD Programs on Outcomes

PD programs influence three main areas: teaching practices, research competence, and student learning outcomes.

Teaching Practices

Participation in PD programs is associated with improved teaching practices. Faculty trained in active learning strategies, assessment design, and technology-enhanced teaching report greater student engagement, improved course delivery, and more effective assessment methods (Shaheen, 2023; Pan & Abd Rani, 2025). For example, faculty implementing group discussions, problem-based learning, and interactive multimedia reported higher student participation and satisfaction. Confidence in using online teaching tools also improved significantly among trained faculty.

Research Competence

PD programs targeting research skills enhance faculty abilities in academic writing, data analysis, grant applications, and ethical research practices (Rashid, Safdar, & Ilyas, 2023). Faculty also benefit from networking opportunities created through PD programs, which foster collaborative research projects at national and international levels. In some universities, research-focused PD programs led to measurable increases in publications in indexed journals, indicating tangible improvements in research productivity.

Student Learning Outcomes

The positive effects of PD programs on faculty teaching practices and research competence indirectly improve student learning outcomes. Studies show that students taught by PD-trained faculty demonstrate higher academic achievement, enhanced critical thinking skills, and increased satisfaction with learning experiences (Kausar et al., 2025). PD programs also enable faculty to design better assessments aligned with learning objectives, contributing to improved learning outcomes.

Sustainability and Challenges

While outcomes are positive, sustainability is a concern. Programs with no follow-up or mentoring exhibit limited long-term impact (Ishrat & Ghias, 2019). Barriers include lack of institutional continuity, insufficient policy enforcement, and absence of a professional learning culture. Successful PD programs incorporate ongoing support, periodic refresher training, and institutional recognition to ensure enduring improvements.

Thematic Synthesis

Across the studies, several key themes emerged:

1. **Integrated PD Programs:** Programs addressing pedagogy, research, and technology together are more effective than single-focus programs.
2. **Collaborative Learning Approaches:** PLCs, mentoring, and peer observation enhance engagement and skill application.

3. **Institutional and Policy Support:** Leadership, resources, and policy alignment are critical for program success.
4. **Program Design and Follow-Up:** Relevance to faculty needs, experiential methods, and sustained mentoring improve outcomes.
5. **Impact on Outcomes:** PD improves teaching quality, research competence, and indirectly, student learning outcomes.

Discussion

The present systematized review examined the effectiveness of university teacher professional development (PD) programs in Khyber Pakhtunkhwa (KP), Pakistan, focusing on program features, factors influencing effectiveness, and impacts on teaching, research, and student outcomes. The discussion synthesizes these findings, contextualizes them within global and national literature, and highlights implications for policy and practice. The review revealed that PD programs in KP universities predominantly focus on pedagogical skills, research competence, and technological proficiency, delivered through workshops, seminars, and online modules. This aligns with international evidence suggesting that comprehensive PD programs combining these components are more effective than single-focus interventions (Pan & Abd Rani, 2025). Pedagogical training emphasizes active learning, formative assessment, and curriculum alignment, which are essential for improving teaching quality (Shaheen, 2023). Research-focused modules enhance faculty abilities in academic writing, data analysis, and grant acquisition, reflecting the global trend of integrating research training into faculty development (Rashid, Safdar, & Ilyas, 2023). The inclusion of ICT and e-learning components addresses the contemporary shift towards digital pedagogy, a factor reinforced during COVID-19 disruptions (Naqvi et al., 2023). These findings suggest that PD programs in KP universities are moving toward internationally recognized standards but still vary in comprehensiveness and implementation quality. Experiential and collaborative approaches, such as professional learning communities (PLCs) and mentoring, were found to significantly enhance engagement and skill transfer (Ahmed, Naudhani, & Wazir, 2025). This finding corroborates Bandura's Social Learning Theory, which emphasises learning through observation, collaboration, and reflective practice (Bandura, 1977). Faculty participating in PLCs reported greater confidence in implementing new teaching and research practices, suggesting that peer support and collaborative problem-solving are critical mechanisms for effective PD. The review identified institutional support, individual motivation, contextual realities, and program design as key determinants of PD effectiveness. Institutions that provide administrative encouragement, resources, and incentives for PD engagement show higher adoption rates (Rana, Farooqi, & Ahmad, 2021). This aligns with previous research indicating that faculty professional growth is strongly influenced by the organizational environment and leadership commitment (Darling-Hammond et al., 2017).

Individual factors, including intrinsic motivation, prior experience, and commitment to professional growth, were found to enhance PD outcomes. Faculty who actively engage with program content and reflect on their practice demonstrate higher improvements in teaching and research (Shaheen, 2023). This supports adult learning theories, which stress the importance of self-directed learning, relevance to professional needs, and active participation (Knowles, Holton, & Swanson, 2015). Contextual and policy-related factors also shape PD effectiveness. Policies that integrate PD into career progression, promotions, and institutional accreditation create structural incentives for faculty participation (HEC, 2023). Conversely, lack of policy enforcement, heavy teaching loads, and infrastructural limitations reduce program impact. These findings are consistent with studies from other developing countries, where PD outcomes are contingent upon systemic support and contextual adaptation (Fullan, 2007). Program design was another critical factor. Programs that incorporate experiential learning, practical

relevance, and sustained follow-up are more successful than one-off workshops (Naqvi et al., 2023). This finding echoes global evidence that effective PD is continuous, contextually relevant, and integrated into daily teaching practice rather than isolated events (Darling-Hammond et al., 2017). The review demonstrates that PD programs positively influence teaching practices, research competence, and student learning outcomes, although the magnitude varies across studies and programs. Faculty reported enhanced use of active learning strategies, improved assessment design, and increased integration of technology in the classroom (Pan & Abd Rani, 2025). This supports prior research suggesting that structured PD enhances pedagogical effectiveness and fosters reflective teaching practices (Shaheen, 2023).

PD programs targeting research skills led to measurable increases in faculty publication output, collaborative research initiatives, and improved methodological competence (Rashid, Safdar, & Ilyas, 2023). The findings highlight that research-focused PD not only strengthens academic productivity but also contributes to improved teaching quality, as faculty incorporate research-based evidence into their instruction (Ahmed, Naudhani, & Wazir, 2025). Improved teaching and research competencies were found to indirectly enhance student learning outcomes, including academic performance, critical thinking, and engagement. These outcomes are consistent with the notion that faculty professional growth has a downstream impact on student learning, emphasizing the importance of aligning PD initiatives with learning-centered educational goals (Kausar et al., 2025). Despite these positive outcomes, sustainability challenges persist. Programs without follow-up, mentoring, or institutional support show limited long-term impact (Ishrat & Ghias, 2019). This finding underscores the importance of creating a culture of continuous professional learning within universities, supported by policies, infrastructure, and leadership.

Conclusion

The discussion demonstrates that university teacher PD programs in KP are effective when designed to integrate pedagogy, research, and technology, supported by institutional and policy frameworks, and sustained through mentoring and collaborative practices. To maximize impact, policymakers and university administrators must consider faculty needs, provide continuous support, and embed PD into institutional culture. Effective PD not only enhances teaching and research competencies but also indirectly contributes to improved student learning outcomes, thereby strengthening the quality of higher education in the region.

Recommendations

1. Develop Integrated and Context-Specific PD Programs

Universities in KP should design professional development programs that combine teaching, research, and technology skills. Programs should be tailored to faculty needs and local educational contexts, incorporating experiential learning such as classroom simulations and collaborative problem-solving to increase engagement and practical application.

2. Establish Continuous Mentoring and Professional Learning Communities (PLCs)

To ensure sustained impact, universities should implement mentoring systems and professional learning communities where experienced faculty support peers through reflection, peer observation, and collaborative projects. This encourages knowledge sharing, motivation, and effective implementation of new teaching and research skills.

3. Strengthen Institutional and Policy Support

Institutional leadership should allocate dedicated time, resources, and incentives for faculty

participation in professional development. PD participation should be linked to career progression, promotions, and recognition, ensuring that faculty prioritize professional growth and apply learning effectively.

4. Implement Follow-Up, Evaluation, and Sustainability Mechanisms

Universities should establish mechanisms for post-training follow-up, refresher courses, and monitoring of teaching and research outcomes. Continuous evaluation ensures that PD programs remain effective, contextually relevant, and capable of producing long-term improvements in faculty competencies and student learning.

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