

Assessing Practices and Effectiveness of Professional Development Program for Special Education Teachers in Pakistan

Masood Ahmad Khan¹ Muhammad Moin² Muhammad Sarwar³ Muhammad Arif⁴



Abstract

This study explored professional development (PD) programs for Special Education Teachers (SETs) in Punjab, Pakistan, focusing on their practices and effectiveness in light of international standards. Although national policy emphasizes special education, there is little systematic evidence on how PD programs are structured, implemented, and perceived. This gap creates challenges in preparing special education teachers to meet the diverse learning needs of students with disabilities. The study was designed to provide an empirical assessment of these issues. The study sought to determine how these programs address planning, curriculum relevance, instructional methods, services, and outcomes. A quantitative research design was employed. Data were collected from 390 participants, including teachers, trainers, institutional heads, and program directors in the Punjab Special Education Department. A combination of census and simple random sampling techniques was used. A structured questionnaire was developed and validated through expert review and exploratory factor analysis. Reliability was high (Cronbach's alpha = 0.974). Data analysis included descriptive and inferential statistical techniques. Findings revealed significant shortcomings in professional development (PD) design and delivery. Weaknesses included lack of needs assessment, limited focus on individualized education plans, minimal integration of assistive technologies, and reliance on theory with little classroom application. Existing supports, such as libraries and technical aid, were inconsistent in quality and access. Female respondents reported lower satisfaction, while long-serving teachers considered programs inadequate for advanced needs. The study recommended shifting from short workshops to sustained, practice-oriented PD with coaching, mentoring, special pedagogy, and follow-up support.

Key Words

Professional Development, Special Education Teachers, Current Practices, Effectiveness of PD Program

Corresponding Author

Masood Ahmad Khan: PhD Scholar, Department of Education, Superior University, Lahore, Punjab, Pakistan.
Email: masoodslp@gmail.com

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Introduction

Teacher Professional Development (TPD) is widely acknowledged as essential for improving teaching quality and student learning (Samundeeswari et al., 2024). Research highlights that ongoing and well-structured PD equips

¹ PhD Scholar, Department of Education, Superior University, Lahore, Punjab, Pakistan. Email: masoodslp@gmail.com

² Associate Professor, Department of Education, Superior University, Lahore, Punjab, Pakistan.
Email: moinawan99@gmail.com

³ Dean, Faculty of Arts and Humanities, Superior University, Lahore, Punjab, Pakistan.
Email: muhammad.sarwar@superior.edu.pk

⁴ Assistant Professor, Department of Education, Superior University, Lahore, Punjab, Pakistan.
Email: mu.arif@superior.edu.pk

teachers with the skills needed to address changing classroom demands (Darling-Hammond et al., 2018). For special education, teachers require not only general pedagogical expertise but also flexible approaches to manage diverse cognitive, behavioral, and physical needs (Weiss et al., 2018). Hence, PD for special educators is increasingly considered central to building inclusive systems (Woulfin & Jones, 2021).

International debates provide a strong foundation for analyzing PD in varied contexts (Ostinelli & Crescentini, 2024). Frameworks such as Guskey's (2002) teacher change model and Desimone's (2009) PD features stress content focus, active participation, coherence with policy, and sustained support. Collaboration, modelling, and coaching further distinguish impactful PD from short, isolated trainings (Darling-Hammond et al., 2018; Nawab, 2018).

Professional Development and Special Education

In special education, the role of professional development (PD) is particularly critical. Many Special education teachers begin with limited pre-service training and depend on in-service PD to strengthen instructional practice (Peterson-Ahmad et al., 2018). Research shows that quality PD lowers burnout, enhances teacher confidence, and promotes effective classroom strategies (Woodcock & Hardy, 2023). Sustained engagement in PD is further linked to gains in literacy, numeracy, and socio-emotional outcomes for students with disabilities (Woodcock & Hardy, 2023). Yet, numerous programs remain fragmented, contextually weak, and without long-term mentorship, especially in developing systems (Powell & Bodur, 2019).

Teacher Professional Development in South Asia and Pakistan

Across South Asia, teacher professional development (PD) systems show uneven progress, reflecting wider disparities in education policies and investment (UNESCO, 2019). While India and Sri Lanka have piloted large-scale initiatives for special education, Pakistan continues to face fragmented and underfunded programs (Ahmad & Nawaz, 2025). Studies consistently point to a disconnection between policy commitments and teacher readiness to apply comprehensive practices (Rafiq-uz-Zaman et al., 2025). Evidence highlights ongoing challenges for Pakistani special educators, including limited training in individualized education plans (IEPs), minimal familiarity with assistive technologies, and scarce opportunities for collaboration (Abbasi et al., 2024). Existing PD is typically short-term, workshop-based, and lacking mentoring or classroom application (Reed & Chappell, 2021). Teachers often describe these programs as generic, misaligned with local needs, and impractical in resource-poor schools (McAleavy et al., 2018). Broader issues of weak funding, few specialised trainers, and inadequate monitoring further diminish impact (Shah et al., 2024).

Global Benchmarks and Local Gaps

International research highlights that effective PD systems integrate teacher learning into school culture, fostering collaboration and reflective practice (Ostinelli & Crescentini, 2024). In Pakistan, however, PD for special education teachers is largely delivered as isolated workshops, offering limited impact on classroom practice. This reflects a notable gap between global benchmarks for PD in special education and the approaches commonly adopted in Pakistan (Tariq et al., 2025; Hussain & Akhter, 2025). The Study mentions the value of continuous and collaborative learning opportunities; however, evidence at a local level shows that often there is a lack of follow-up and peer support (Markowski et al., 2021). In the same manner, Darling-Hammond et al. (2017) also point out the importance of job-embedded, continuous professional learning; however, structures in Pakistan's PD system often remain episodic and short-term. The Punjab Special Education Policy 2020 further acknowledged PD programs as irregular and poorly structured, reflecting systemic weaknesses in professional training for special educators (Government of Punjab, 2020).

Rationale and Research Gap

The rationale of this study stems from the scarcity of systematic research on professional development (PD) for special education teachers in Pakistan, despite its acknowledged importance (Hussain & Akhter, 2025). Existing literature identifies significant shortcomings, such as insufficient evidence-based insights, inadequately designed programs, and the lack of disability-specific training opportunities (DeJesus, 2025). High-quality PD has been shown to strengthen teacher confidence and improve educational outcomes for learners with disabilities, reinforcing its critical role in inclusive education (Anderson & Putman, 2020). Yet, Pakistan's PD initiatives are rarely examined in light of international frameworks, leaving a gap in understanding how global benchmarks can inform localized practices. Addressing this gap, the study aims to evaluate the current practices and effectiveness of PD programs, offering evidence to inform both national policy and global discourse.

Significance of the Study

This study holds significance as it fills a major research gap on teacher professional development (PD) in Pakistan's special education sector. By systematically assessing PD practices and their effectiveness, it generates context-specific evidence that goes beyond generic, externally imported models. The findings provide actionable recommendations for policymakers, including the National Institute of Special Education and the Punjab Special Education Department, to design coherent and standardised PD frameworks aligned with both international best practices and local realities. For practitioners, the study highlights current strengths and critical gaps, offering a roadmap for practical, high-impact training in areas such as special pedagogy and assistive technology, thereby enhancing teaching quality and student outcomes. Globally, the research contributes by examining how established PD models operate within Pakistan's socio-cultural context and aligns with the United Nations Sustainable Development Goals on quality education and equity. Thus, the study bridges policy and practice while linking local challenges with global discourse.

Literature Review

Theoretical Foundations of Professional Development

The theoretical basis of professional development (PD) is closely linked to adult learning theories. Knowles' (1980) andragogy highlights that adult learning is self-directed, experiential, and contextually meaningful, aligning well with teachers' professional needs. Similarly, Vygotsky's (1978) sociocultural theory emphasizes social interaction, scaffolding, and mediated learning as central to professional growth. Bruffee's (1984) collaborative learning model further underscores peer-based knowledge construction, supporting the role of dialogue and professional learning communities (Smagorinsky, 2023). Together, these frameworks justify PD approaches that focus on mentoring, coaching, collaborative problem-solving, and reflective practice (Kennedy, 2016). In special education, such theories inform practices like collaborative IEP planning, peer coaching, and inclusion-focused learning communities. Nevertheless, operationalizing these models in low-resource contexts faces challenges, including limited institutional support, inadequate funding, and scarce access to expert trainers (Hanif et al., 2022; Hussain & Akhter, 2025; Rafiq-uz-Zaman et al., 2025).

Characteristics of Effective Professional Development

Effective professional development (PD) is characterized by sustained duration, content focus, active learning opportunities, and alignment with school and policy priorities (Desimone, 2009; Guskey, 2002). For special education teachers, PD should be practical, classroom-embedded, and tailored to special teaching techniques, assistive technologies, and differentiated instruction (Alquraini & Rao, 2020). Darling-Hammond et al. (2017) note that PD is most impactful when embedded in collaborative professional cultures and supported by follow-up coaching. However, studies from low- and middle-income countries reveal that many PD initiatives fail to meet

these standards. Programs often emphasize quantity over quality, offering generic workshops with minimal relevance to teachers' specific needs (Opoku, 2023; Adjei et al., 2024). Furthermore, sustained mentoring and classroom integration are frequently absent, limiting long-term effectiveness and practical benefits.

Professional Development in Pakistan

In Pakistan, professional development (PD) for special education teachers reflects many of the challenges observed globally (Iqbal & Ali, 2024). Studies indicate that PD is often limited to short workshops that lack continuity, follow-up, and direct relevance to teachers' instructional needs (Toman & Maag, 2024). Opportunities for specialization in areas such as behavior management, individualized education plans (IEPs), and assistive technology remain scarce, despite their centrality to effective special education (Gautam, 2024). Structural issues, including inadequate funding, a shortage of expert trainers, and weak institutional support, further diminish the quality and impact of these initiatives on the PD program (Shah et al., 2024).

Despite these shortcomings, the demand for contextually grounded PD is increasing. Policy commitments and the expansion of special education highlight the growing responsibilities of teachers (UNESCO, 2019). Yet, without robust PD, translating policy into practice remains a challenge. The comparative survey data reveal that although PD programs experience moderate global participation rates, their effectiveness suffers when systemic support is inadequate. (Popova et al., 2022). Pakistan exemplifies this trend, with limited alignment between PD activities and classroom application (Kamran & Bano, 2025).

This research employs a two-dimensional framework. The first examines current PD practices—training nature, delivery modes, participation levels, and policy alignment. The second evaluates effectiveness, focusing on content relevance, skill acquisition, teacher engagement, and impact on instruction and learning. By situating Pakistan's case within global PD discourse, the study addresses a national gap while offering insights on adapting evidence-based models to low-resource contexts (Darling-Hammond et al., 2017; Guskey, 2002; Desimone, 2009). This study bridges Pakistan's PD research gap while enriching global literature, showing how low-resource contexts can adapt evidence-based models to enhance special education teachers' skills and effectiveness.

Objectives of the Study

1. To evaluate the current practices in professional development for special education teachers in Pakistan
2. To assess the effectiveness of current professional development programs for special Education teachers in Pakistan

Research Questions

1. What are the current professional development practices for special education teachers in Pakistan?
2. How effective are the existing professional development programs in enhancing the knowledge, skills, and practices of special education teachers in Pakistan?

Methodology

This study was approved by the Advanced Studies and Research Board of Superior University, Lahore, as part of the doctoral dissertation requirements. In line with institutional policies, dissemination in a peer-reviewed journal formed a compulsory component of the PhD process. A quantitative research design was adopted to investigate current practices and perceived effectiveness of professional development (PD) programs for Special Education Teachers (SETs) in Punjab, Pakistan. This design was chosen to generate measurable data from a large sample, ensuring reliability and generalizability of findings.

The study population included teachers, trainers, institutional heads, and program directors affiliated with the Government of Punjab's Special Education Department. Using A combination of census and simple random sampling techniques, 390 participants were selected to secure representation across professional roles and reduce bias. Data were collected through a structured questionnaire developed after a review of international PD evaluation standards and consultations with local experts. Content validity was established through expert review by eight specialists in special education, teacher training, and educational research. Exploratory Factor Analysis (EFA) was performed to confirm construct validity, while reliability testing produced a Cronbach's alpha of 0.974, indicating excellent internal consistency.

Data were processed using SPSS software. Descriptive statistics (means, standard deviations) provided an overview of PD practices, while inferential tests, including t-tests and one-way ANOVA, identified significant differences across groups based on professional role, experience, and demographic background.

This multi-level analysis allowed both a broad assessment and comparative insights into stakeholder perspectives. The methodology adhered to national and international ethical standards, ensuring compliance with institutional protocols for human participant research. By integrating rigorous sampling, validated instruments, and robust statistical techniques, the study establishes a strong evidence base for evaluating the effectiveness of PD initiatives. The adopted design enhances reliability and supports the practical application of findings in developing inclusive, contextually relevant PD frameworks for special education teachers in Pakistan.

Data Analysis

Analysis of Different Factors in Current Practices in PD

Table 1

Pre-Planning of Professional Development (PD) Programs

S. No	Statement	N	Min	Max	Mean	S.D
1	The objectives of professional development training are clearly defined before the sessions begin.	390	1	5	3.23	1.259
2	Training programs are designed based on a comprehensive needs assessment of special education teachers.	390	1	5	3.44	1.208
3	Teachers are adequately informed about the format of professional development sessions in advance.	390	1	5	3.35	1.293
4	Relevant stakeholders, including administrators and trainers, are actively involved in the planning process of PD programs to ensure training aligns with institutional goals.	390	1	5	3.66	1.107
5	Training institutions provide financial resources to support the professional development of trainees while addressing their needs.	390	1	5	3.76	1.179

Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5

This table presents descriptive statistics on pre-planning in professional development (PD) programs from 390 participants. PD objectives appear clear ($M = 3.23$), though variability suggests uneven implementation. Alignment with instructors' needs is moderate ($M = 3.44$), indicating a need for stronger needs assessments. Basic session information is provided ($M = 3.35$), but earlier and clearer communication could improve preparation. Stakeholder involvement is relatively strong ($M = 3.66$), reflecting effective collaboration. Financial support receives broad acknowledgement ($M = 3.76$), though responses indicate uneven distribution across institutions. Overall, PD

planning meets basic requirements but would benefit from clearer objectives, improved alignment with needs, timely communication, and consistent resource allocation.

Table 2

Curriculum Relevance of PD Programs

S. No	Statement	N	Min	Max	Mean	S. D
6	The PD training curriculum addresses the diverse needs of students with disabilities.	390	1	5	3.51	1.124
7	The PD program is able to adequately focus on individualized education planning (IEPs).	390	1	5	3.56	1.141
8	The curriculum is aligned with international standards of special education.	390	1	5	3.90	0.994
9	The training integrates assistive technologies into the curriculum to support trainee teachers with disabilities.	390	1	5	3.74	1.080
10	The training module encourages collaboration among teachers to design an effective curriculum in special education.	390	1	5	3.61	1.112

The results indicate limited alignment of professional development (PD) programs with the curriculum for special education teachers in Pakistan. Alignment with global norms is moderate ($M = 3.90$) but below desired levels, reflecting weak adoption of international best practices. Assistive technology use ($M = 3.74$) offers only partial support and does not equip teachers with sufficient technical skills for special classrooms. Curriculum development shows moderate collaboration ($M = 3.61$), though broader participation could strengthen outcomes. Training in Individualized Education Programs ($M = 3.56$) and differentiated instruction ($M = 3.51$) remains inadequate, highlighting major gaps in essential competencies. High standard deviations (0.994–1.141) across all indicators suggest uneven program quality, with benefits varying substantially among teachers. Overall, the findings underscore the need for curriculum reforms that integrate global standards, technology use, collaborative planning, and targeted training in IEP and comprehensive practices.

Table 3

Teaching Techniques in Professional Development (PD) Programs

S. No	Statement	N	Min	Max	Mean	S. D
11	Pedagogical approaches applied in training are applicable to real classroom situations.	390	1	5	3.71	1.105
12	The PD training equips teachers to adapt lesson plans for students with different disabilities.	390	1	5	3.58	1.119
13	PD training programs focus on differentiated instruction personalized to individual student needs.	390	1	5	3.59	1.081
14	Teachers are trained to use a variety of instructional methods to engage students with special needs.	390	1	5	3.47	1.149
15	Teachers are given opportunities to evaluate and improve their teaching methods during training.	390	1	5	3.57	1.182

Findings on teaching techniques in professional development (PD) programs for special education teachers in Pakistan reveal considerable variation in applying acquired knowledge. Instructional approaches are often ineffective in classrooms ($M = 3.71$, $SD = 1.105$), suggesting a gap between theory and practice and highlighting the need for more interactive, classroom-oriented training. Differentiated instruction is insufficiently emphasized ($M = 3.59$, $SD = 1.081$), limiting teachers' ability to address individual learning needs. Similarly, inadequate

preparation to adapt lessons for diverse disabilities ($M = 3.58$, $SD = 1.119$) reflects weak support in special training. Teachers also reported limited opportunities for reflective practice ($M = 3.57$, $SD = 1.182$), with the absence of systematic evaluation restricting professional growth. Finally, inadequate exposure to diverse instructional methods ($M = 3.47$, $SD = 1.149$) underscores the lack of comprehensive pedagogical training. Overall, results indicate that PD programs require a stronger emphasis on practical application, differentiated strategies, special teaching techniques, reflective practice, and methodological diversity to enhance effectiveness in special education.

Table 4

Services and Resources in Professional Development (PD) Programs

S. No	Statement	N	Min	Max	Mean	S. D
16	Sufficient teaching aids, including digital tools, are provided during professional development sessions.	390	1	5	3.86	0.982
17	Teachers have access to well-equipped resource libraries or labs to enhance their learning during the training session.	390	1	5	3.97	0.783
18	Teachers are provided with technical support for the effective use of assistive technology in the training classroom.	390	1	5	3.99	0.880
19	Follow-up sessions are provided to support teachers in effectively utilizing resources and addressing classroom challenges.	390	1	5	3.86	0.847
20	Teachers are provided with access to online platforms or portals for continuous learning and resource sharing.	390	1	5	3.82	0.930
21	Daycare centers are provided for mother trainees to accommodate their infants during training sessions.	390	1	5	4.02	0.993
22	Accommodations, including boarding and lodging, or hiring support, are provided to participants.	390	1	5	3.94	0.934

The study examines professional development (PD) programs for special education teachers in Pakistan. Access to key facilities and support systems is moderate. Daycare services for mother trainees scored highest ($M = 4.02$, $SD = 0.993$). This helps female educators with infants attend training without childcare issues. Technical support for assistive technology also scored well ($M = 3.99$, $SD = 0.880$). Teachers receive adequate help in using tech tools in classrooms. Resource libraries or labs had a mean score of 3.97 ($SD = 0.783$). Boarding and lodging facilities scored 3.94 ($SD = 0.934$). These services exist but may vary in quality and access. Improving these could enhance training outcomes. Teaching aids and follow-up support both averaged 3.86. While available, their use in practice may be limited. Online learning platforms scored lowest ($M = 3.82$, $SD = 0.930$). This suggests weak digital resource-sharing. Better virtual tools are needed for ongoing teacher development.

Table 5

T-Test Group Statistics for Gender Differences in Current Practices of Professional Development (PD) Program Components

Variable	Gender	N	Mean	Std. Deviation	Std. Error Mean
Pre-Planning of PD Programs	Male	200	3.68	0.98	0.07
	Female	190	3.29	0.89	0.06
Curriculum Relevance of PD Programs	Male	200	3.84	0.83	0.06
	Female	190	3.48	0.86	0.06
Teaching Strategies	Male	200	3.78	0.89	0.06
	Female	190	3.39	0.86	0.06
Services and Resources	Male	200	3.97	0.66	0.05
	Female	190	3.87	0.68	0.05

The table compares male and female responses on current professional development (PD) practices. Key differences emerge across four dimensions. In Pre-Planning, males scored higher (3.68) than females (3.29), suggesting men perceive better preparatory processes. For Curriculum Relevance, males reported greater satisfaction (3.84 vs. 3.48), implying PD content aligns more closely with their instructional needs. This may indicate accessibility gaps for female educators. Regarding Teaching Strategies, males rated practicality higher (3.78 vs. 3.39), viewing PD methods as more actionable. In Services and Resources, both genders responded positively, though males scored marginally higher (3.97 vs. 3.87). Male participants expressed consistently higher satisfaction across all dimensions. These differences may reflect variations in access, engagement, or perception. Further statistical analysis is required to confirm significance.

Table 6

One-way ANOVA Results under the Construct: Current Practices in Professional Development by Educational qualification

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Pre-Planning of PD Programs	15.734	4	3.933	4.487	.001
Curriculum Relevance of PD Programs	19.581	4	4.895	7.023	.000
Teaching Strategies	15.341	4	3.835	4.948	.001
Services and Resources	17.977	4	4.494	11.034	.000

The one-way ANOVA shows clear differences in how teachers view current PD practices based on their education level. The biggest gap was in "Services and Resources" ($F = 11.034$, $p < .001$). Teachers with higher qualifications noticed more issues with institutional support. "Curriculum Relevance" also varied significantly ($F = 7.023$, $p < .001$). More educated teachers were stricter about whether PD content matched standards. Differences also appeared in "Teaching Strategies" ($F = 4.948$, $p = .001$) and "Pre-Planning of PD Programs" ($F = 4.487$, $p = .001$). Teachers with advanced degrees expected better methods and organization in PD. These results show that education level affects how teachers see PD programs. Adjusting PD for different education levels could make it more effective.

Table 7

One-Way ANOVA Results under the Construct: Current Practices in Professional Development by Years of Teaching Experience

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Pre-Planning of PD Programs	12.076	3	4.025	4.555	.004
Curriculum Relevance of PD Programs	7.548	3	2.516	3.464	.016
Teaching Strategies	6.850	3	2.283	2.872	.036
Services and Resources	0.378	3	0.126	0.279	.841

The study found that teachers' years of experience significantly shape their views on professional development (PD) programs. More experienced teachers showed greater scrutiny toward PD pre-planning ($p = .004$), likely due to their extensive background with various training approaches. They also placed stronger emphasis on curriculum relevance ($p = .016$), suggesting veteran educators prioritize alignment between PD content and classroom needs. Differences also emerged in evaluating teaching strategies ($p = .036$), with seasoned teachers assessing methods against practical experience, while newer teachers appeared more open to unfamiliar approaches. Interestingly, all teachers shared similar perceptions of PD services and resources ($p = .841$), indicating these aspects meet needs consistently across experience levels.

Table 8*One-Way ANOVA Results under the Construct: Current Practices in Professional Development by Area of Specialization*

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Pre-Planning of PD Programs	6.488	4	1.622	1.801	.128
Curriculum Relevance of PD Programs	3.780	4	0.945	1.280	.277
Teaching Strategies	6.141	4	1.535	1.922	.106
Services and Resources	2.157	4	0.539	1.203	.309

The analysis shows no significant differences in perceptions of current professional development practices across areas of specialization. Pre-Planning of PD Programs ($F = 1.801$, $p = .128$), Curriculum Relevance of PD Programs ($F = 1.280$, $p = .277$), Teaching Strategies ($F = 1.922$, $p = .106$), and Services and Resources ($F = 1.203$, $p = .309$) all failed to reach statistical significance. This indicates a generally consistent perception among educators, regardless of their area of specialization, concerning the planning, curriculum alignment, teaching strategies, and availability of services in PD programs. The uniformity in responses suggests that specialization does not substantially influence how these aspects of PD are experienced or valued, pointing to possible standardization in program design across different special education fields.

Table 9*One-Way ANOVA Results under the Construct: Current Practices in Professional Development by Opportunity Availed to Attend the PD Program*

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Pre-Planning of PD Programs	6.975	3	2.325	2.592	.052
Curriculum Relevance of PD Programs	7.478	3	2.493	3.431	.017
Teaching Strategies	15.030	3	5.010	6.474	.000
Services and Resources	16.130	3	5.377	13.081	.000

The one-way ANOVA results reveal that the opportunity to attend professional development (PD) programs significantly influences teachers' perceptions across several dimensions. For Pre-Planning of PD Programs, the effect is marginally significant ($F = 2.592$, $p = .052$), suggesting a potential difference in perceptions based on PD access. Significant differences are observed in Curriculum Relevance ($F = 3.431$, $p = .017$), Teaching Strategies ($F = 6.474$, $p < .001$), and Services and Resources ($F = 13.081$, $p < .001$). These findings indicate that teachers with greater access to PD programs perceive the curriculum as more relevant, the teaching strategies as more effective, and the services and resources as more adequate compared to those with limited access. Therefore, enhancing opportunities for PD participation may positively impact teachers' perceptions and experiences across these critical areas.

Analysis of Different Factors in Assessing Effectiveness of PD Program

Table 10*Content Relevancy of Professional Development (PD) Programs*

S. No	Items	N	Min	Max	Mean	S.D.
1.	The content of the PD program aligns with teaching needs for students with disabilities.	390	1	5	3.52	1.000
2.	The training provides practical strategies that can be applied in the classroom.	390	1	5	3.72	0.964

S. No	Items	N	Min	Max	Mean	S.D.
3.	The topics covered in the program are relevant to the challenges faced by special education teachers.	390	1	5	3.60	1.044
4.	The examples and case studies used in the PD program are relevant to real-life classroom scenarios in special education.	390	1	5	3.66	1.048

The study reveals moderate dissatisfaction with the content of professional development (PD) programs for special education teachers in Pakistan. While training provides some practical strategies (M=3.72), participants feel these do not fully prepare them for the complex realities of their classrooms. Case studies and examples (M=3.66) are only somewhat relevant, limiting their real-world applicability. Additionally, the topics covered (M=3.60) only partially align with the daily challenges teachers face. Most concerning is the weak connection between PD content and the specific needs of students with disabilities (M=3.52), indicating a critical gap in program design.

Table 11

Instructional Strategies in Professional Development (PD) Programs

S. No	Items	N	Min	Max	Mean	S.D.
5.	The instructional methods used in the training are engaging and interactive.	390	1	5	3.48	1.087
6.	Training sessions offer abundant opportunities for collaboration with co-trainees.	390	1	5	3.54	1.040
7.	There is a necessary emphasis on hands-on activities and practical demonstrations in the training session.	390	1	5	3.65	1.021
8.	The PD training includes a variety of teaching methodologies to address different learning styles.	390	1	5	3.67	0.976

The study reveals moderate dissatisfaction with instructional approaches in professional development (PD) programs for special education teachers. While trainers incorporate diverse teaching methods (M=3.67), participants report that these remain inadequate for addressing real classroom challenges. Hands-on learning components (M=3.65) are present but underutilized, limiting opportunities for skill application. Collaborative elements score lower (M=3.54), indicating sporadic peer engagement during training. Most critically, programs lack dynamic, interactive teaching techniques (M=3.48), resulting in passive learning experiences.

Table 12

Acquisition of Knowledge and Skills in Professional Development (PD) Programs

S. No	Items	N	Min	Max	Mean	S.D.
9.	The training offers updated information on recent trends and progresses in special education.	390	1	5	3.59	1.093
10.	The sessions focus on building expertise in assessing and addressing students' individual learning challenges.	390	1	5	3.58	1.005
11.	The professional development program enhances knowledge of effective teaching strategies for students with special needs.	390	1	5	3.37	1.194
12.	The PD training sessions provide practical skills that can be applied in the classroom.	390	1	5	3.58	1.091

The study indicates moderate effectiveness of professional development (PD) programs in enhancing special education teachers' competencies. While participants acknowledge receiving updates on current trends (M=3.59),

this aspect requires significant strengthening to keep pace with global best practices. The development of assessment and intervention skills shows comparable results ($M=3.58$), suggesting these crucial competencies are only partially addressed. Classroom-applicable practical training yields similar scores ($M=3.58$), revealing inconsistent emphasis on hands-on skill development. Most concerning is the weak performance in core instructional strategies ($M=3.37$), indicating PD programs fail to adequately prepare teachers for the specialized demands of their classrooms. These findings collectively demonstrate that while current initiatives provide baseline knowledge, they fall short of developing the sophisticated skill set required for quality special education instruction.

Table 13

Teacher Engagement in Professional Development (PD) Programs

S. No	Items	N	Min	Max	Mean	S.D.
13.	The professional development program inspires improvement in teaching.	390	1	5	3.39	1.198
14.	The training sessions encourage active participation or involvement in learning.	390	1	5	3.42	1.311
15.	The PD program motivates teachers to customize their teaching approaches to meet the unique needs of special students.	390	1	5	3.41	1.248
16.	The PD program helps build confidence in implementing new teaching methods.	390	1	5	3.45	1.190
17.	Trainee teachers have a positive opinion about the current PD program.	390	1	5	3.49	1.117

The table presents data on teacher engagement in professional development (PD) programs for special education teachers in Pakistan. Trainee teachers show moderate satisfaction, with a highest mean score of 3.49. This indicates a somewhat positive view of current PD programs, though not strongly favorable. Confidence in applying new teaching methods scored 3.45, suggesting moderate training benefits. Participation in PD activities had a mean of 3.42, reflecting limited interactivity. The mean score of 3.41 for adapting teaching methods shows minimal impact on customization. The lowest score, 3.39, reveals a lack of motivation to enhance teaching practices. These results highlight a need for PD programs to become more engaging and effective. While teacher engagement exists, improvements are necessary to make PD more inspiring and transformative for special education teachers.

Table 14

Impact of Professional Development (PD) Program on Student Outcomes

S. No	Items	N	Min	Max	Mean	S.D.
18.	The current PD program fosters a supportive learning environment for students with diverse needs.	390	1	5	3.45	1.150
19.	The sessions are designed to enhance teachers' skills in assessing and addressing the specific learning challenges of students with special needs.	390	1	5	3.42	1.158
20.	The current PD program impacts students' academic performance.	390	1	5	3.46	1.175
21.	The current PD program contributes to improving students' behavior and classroom interactions.	390	1	5	3.38	1.127

The table assesses how professional development (PD) programs influence student outcomes. Results show moderate effectiveness. The highest mean score (3.46) suggests PD moderately improves academic performance.

Comprehensive learning environments for diverse needs scored 3.45, indicating some success in fostering support. Teachers' ability to assess and address learning challenges received a 3.42, reflecting moderate skill application. The lowest score (3.38) reveals minimal impact on student behavior and interaction. While PD aids academic and classroom improvements, its effect on behavioral outcomes remains weak. These findings highlight the need for PD programs to strengthen their focus on social and behavioral development.

Table 15

T-Test Group Statistics for Gender Differences in Effectiveness of PD Programs

Variable	Gender	N	Mean	Std. Deviation	Std. Error Mean
Content Relevancy	Male	200	3.81	0.81	0.06
	Female	190	3.43	0.85	0.06
Instructional Strategies	Male	200	3.84	0.82	0.06
	Female	190	3.31	0.83	0.06
Acquisition of Knowledge and Skill	Male	200	3.77	0.94	0.07
	Female	190	3.27	0.88	0.06
Teachers' Engagement in PD Program	Male	200	3.74	1.03	0.07
	Female	190	3.10	1.02	0.07
Impact of PD Program on Students' Outcomes	Male	200	3.68	1.02	0.07
	Female	190	3.17	1.00	0.07

Male participants consistently rated all five components higher than their female counterparts. For content relevancy, males (n=200) averaged 3.81 (SD=0.81) versus females' (n=190) 3.43 (SD=0.85). Similar gaps appeared in instructional strategies (males: 3.84, SD=0.82; females: 3.31, SD=0.83) and knowledge acquisition (males: 3.77, SD=0.94; females: 3.27, SD=0.88). Teacher engagement showed males at 3.74 (SD=1.03) compared to females' 3.10 (SD=1.02). For impact on student outcomes, males averaged 3.68 (SD=1.02) while females reported 3.17 (SD=1.00). These patterns suggest male educators view PD programs as more effective overall. Future research should analyze whether these differences are statistically significant.

Table 16

One way ANOVA Results under the Construct: Assessing Effectiveness of Professional Development by Educational qualification

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Content Relevancy	15.873	4	3.968	5.810	.000
Instructional Strategies	13.800	4	3.450	4.758	.001
Acquisition of Knowledge and Skill	13.755	4	3.439	4.001	.003
Teachers' Engagement in PD Program	12.024	4	3.006	2.651	.033
Impact of PD Program on Students' Outcomes	15.925	4	3.981	3.773	.005

The one-way ANOVA shows clear differences in how PD effectiveness is viewed based on education level. The biggest difference is in "Content Relevancy" ($F = 5.810$, $p = .000$). Teachers with advanced degrees want deeper curriculum links, while those with basic training focus on practical classroom use. Differences also appear in "Instructional Strategies" ($F = 4.758$, $p = .001$) and "Acquisition of Knowledge and Skill" ($F = 4.001$, $p = .003$). More educated teachers prefer specialized methods and learning results. "Teachers' Engagement in PD Programs" ($F = 2.651$, $p = .033$) also varies. Those with higher education may participate more critically. "Impact of PD Programs on Students' Outcomes" ($F = 3.773$, $p = .005$) differs too. Teachers with more education often see a stronger PD-

student success connection. These results suggest PD programs should adapt to different education levels for better results.

Table 17

One-Way ANOVA Results under the Construct: Assessing Effectiveness of Professional Development by Years of Teaching Experience

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Content Relevancy	1.863	3	0.621	0.866	.459
Instructional Strategies	2.047	3	0.682	0.905	.439
Acquisition of Knowledge and Skills	1.262	3	0.421	0.473	.701
Teachers' Engagement in PD Programs	14.643	3	4.881	4.341	.005
Impact of PD Programs on Students' Outcomes	2.846	3	0.949	0.873	.455

The analysis shows that teachers' engagement in PD programs significantly varies with years of experience ($F = 4.341$, $p = .005$), indicating that experienced teachers may be less engaged, possibly due to repeated exposure to standard formats, while newer teachers may be more enthusiastic. In contrast, content relevancy ($F = 0.866$, $p = .459$), instructional strategies ($F = 0.905$, $p = .439$), acquisition of knowledge and skills ($F = 0.473$, $p = .701$), and impact on student outcomes ($F = 0.873$, $p = .455$) display no significant differences across experience levels. This suggests a uniform perception of these dimensions, implying a standardized delivery that may not fully address the evolving needs of teachers at different career stages. The findings highlight a need for PD programs to better engage experienced teachers with innovative strategies while continuing to support novice educators effectively.

Table 18

One-Way ANOVA Results under the Construct: Assessing Effectiveness of Professional development by Area of Specialization

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Content Relevancy	5.855	4	1.464	2.064	.085
Instructional Strategies	20.396	4	5.099	7.203	.000
Acquisition of Knowledge and Skills	5.942	4	1.485	1.688	.152
Teachers' Engagement in PD Programs	17.152	4	4.288	3.826	.005
Impact of PD Program on Student Outcomes	16.847	4	4.212	4.000	.003

The analysis shows significant differences in perceptions of the effectiveness of professional development across areas of specialization for certain dimensions. Instructional Strategies ($F = 7.203$, $p = .000$), Teachers' Engagement in PD Programs ($F = 3.826$, $p = .005$), and Impact of PD Program on Student Outcomes ($F = 4.000$, $p = .003$) all reached statistical significance, indicating that the effectiveness of these aspects is perceived differently depending on the area of specialization. This suggests that educators from various specializations experience diverse levels of engagement, instructional impact, and student outcomes. On the other hand, Content Relevancy ($F = 2.064$, $p = .085$) and Acquisition of Knowledge and Skills ($F = 1.688$, $p = .152$) did not show significant differences, implying consistency in perceptions across specialization areas. These findings highlight the need to address specialization-specific gaps to enhance PD effectiveness.

Table 19

One-Way ANOVA Results under the Construct: Assessing Effectiveness of Professional Development by Opportunity Availed to Attend the PD Program

PD Program Dimension	Sum of Squares Between	df	Mean Square Between	F	Sig.
Content Relevancy	37.494	3	12.498	19.989	.000
Instructional Strategies	30.972	3	10.324	15.212	.000
Acquisition of Knowledge and Skill	29.587	3	9.862	12.082	.000
Teachers' Engagement in PD Program	28.916	3	9.639	8.864	.000
Impact of PD Program on Students' Outcomes	4.000	3	1.333	1.231	.298

A one-way ANOVA was conducted to examine whether the opportunity to attend professional development (PD) programs significantly affects educators' perceptions of PD effectiveness across various dimensions. The analysis revealed statistically significant differences in perceptions of content relevancy, $F(3, N) = 19.99$, $p < .001$; instructional strategies, $F(3, N) = 15.21$, $p < .001$; acquisition of knowledge and skills, $F(3, N) = 12.08$, $p < .001$; and teacher engagement in PD programs, $F(3, N) = 8.86$, $p < .001$. These findings suggest that educators with greater access to PD opportunities perceive the programs as more relevant, effective in instructional strategies, beneficial for skill acquisition, and engaging. However, no significant difference was found regarding the perceived impact of PD programs on student outcomes, $F(3, N) = 1.23$, $p = .298$, indicating that educators' views on student-related outcomes are consistent regardless of their PD attendance.

Findings

Current Practices in Professional Development of SETs

The results highlighted serious shortcomings in the planning and design of professional development (PD). Quantitative evidence showed weak preparation, with poor satisfaction on needs assessment, goal clarity, and teacher involvement. Senior teachers and those with higher qualifications reported the greatest dissatisfaction, supported by ANOVA and post hoc analysis. Course content was outdated, offering little on IEP development, assistive technologies, or behavioral interventions. Training remained highly theoretical, with minimal use of demonstrations, role-play, or simulations. Resource support, such as travel or accommodation, was inconsistent, creating barriers for rural teachers and those beyond hearing impairment specialization. These findings align with Guskey's (2002) claim that PD must be contextually responsive. Teacher participation in planning increases engagement and classroom use (Woulfin & Jones, 2021). Similarly, research-based PD improves instructional quality and student outcomes (Brock & Carter, 2015). However, in this study, PD programs offered theoretical concepts rather than practical methods, with little alignment to international benchmarks (UNESCO, 2017; CEC, 2015; AASEP, 2021). Pedagogical approaches were also weak. Most sessions relied on lecture-based delivery, with limited modeling of strategies or opportunities for practice. Follow-up supports such as mentorship, learning communities, or digital networks were largely absent, particularly in remote areas.

Overall, findings stress the urgent need for reforms. Updated curricula, global alignment, differentiated methods, and sustainable support systems are essential to enhance teacher growth and effectiveness.

Effectiveness of Current Professional Development Program

Findings from Objective 2 reveal that professional development (PD) programs for special education teachers in Pakistan are largely ineffective, offering minimal long-term benefits. Across five dimensions, PD content, instructional methods, knowledge and skills, teacher engagement, and student outcomes mean scores were

consistently low. While some sessions offered relevant knowledge, most were broad and generic, failing to address teachers' specialized needs or differences in experience. Instructional delivery was primarily lecture-based, relying heavily on PowerPoint with little interaction. Limited collaboration and active learning restricted teachers' ability to implement strategies in special classrooms, diverging from international standards (UNESCO, 2017; CEC, 2020). Teachers also noted the absence of practical examples, peer exchange, and exposure to specialized methods, reducing applicability in diverse settings (Darling-Hammond et al., 2017). Sustained support was largely missing. Knowledge was seldom reinforced through mentoring, follow-up, or professional learning communities. Senior teachers expressed particular dissatisfaction, reporting repetitive material and unresponsive facilitation (Desimone, 2009). As a result, PD contributed little to classroom practice or student outcomes, echoing Guskey's (2002) concerns about shallow PD structures. Another critical gap was the lack of evaluation frameworks. Without systematic monitoring or feedback, teachers received minimal guidance on applying new skills, limiting accountability and confidence (Desimone, 2009; Guskey, 2002).

Overall, findings point to systemic weaknesses generic content, passive delivery, poor contextualization, weak follow-up, and no evaluation. Addressing these requires sustained, interactive, and context-specific PD models that are continuously evaluated to strengthen teacher capacity and student learning.

Discussion and Conclusion

This study assessed professional development (PD) practices and effectiveness for special education teachers (SETs) in Punjab, Pakistan. Findings highlight partial strengths but substantial weaknesses. While some infrastructural supports—such as resource libraries, technical assistance, and daycare were moderately available, PD design and delivery remained weak. Needs assessments were inconsistently used, and training content lacked alignment with international standards, particularly in individualized education plans (IEPs), differentiated instruction, and assistive technology. These gaps reinforce earlier critiques that PD in developing contexts is often fragmented, theoretical, and disconnected from classroom realities (Cadero-Smith, 2020).

A key finding was gender disparity: female educators consistently reported lower satisfaction and perceived effectiveness than males. Teachers with higher qualifications and longer experience were also more critical, suggesting a mismatch between standardized PD and advanced professional needs. This aligns with global evidence emphasizing the importance of differentiated, contextually relevant PD (Desimone, 2009; Darling-Hammond et al., 2017).

Although PD participation modestly improved teacher perceptions, it had limited effect on student outcomes, particularly behavioral and socio-emotional development. This reflects the need for sustained, practice-based PD models directly linked to classroom implementation (Guskey, 2002).

The study concludes that PD programs for SETs in Punjab remain ineffective, relying on short, theory-heavy workshops with minimal practical application. Reforms should emphasize sustained mentoring, disability-specific curricula, gender-responsive delivery, and rigorous monitoring linked to student outcomes. A systemic approach that blends global standards with Pakistan's realities is essential to strengthen teacher competencies and ensure inclusive education, improving opportunities and outcomes for students with disabilities.

Recommendations

Grounded in the critical analysis of existing professional development (PD) practices and their effectiveness, the following recommendations aim to advance PD for Special Education Teachers (SETs) in Punjab, Pakistan, through contextually relevant, equitable, and sustainable approaches aligned with international best practices.

1. **Strengthen PD Planning and Needs Assessment:** Conduct systematic needs assessments before designing PD to ensure training is contextually relevant and tailored to teachers' instructional challenges.
2. **Update and Localize Curriculum Content:** Revise PD curricula to include disability-specific modules such as IEP development, behavior management, differentiated instruction, and assistive technology, aligned with international standards.
3. **Promote Practice-Based Learning:** Replace theory-heavy workshops with simulations, role-play, classroom demonstrations, and case studies to enhance teachers' ability to apply learning directly.
4. **Introduce Sustained Coaching and Mentorin:** Develop ongoing mentoring and peer coaching systems to reinforce skills after training, particularly through professional learning communities and virtual networks.
5. **Ensure Gender-Sensitive PD Deliver:** Address gender disparities by providing equitable access to training, considering contextual barriers faced by female educators in participation and application.
6. **Expand Access for Rural Teachers:** Provide travel, accommodation, and digital learning options to reduce participation barriers for rural teachers and those in specialized disability categories.
7. **Foster Teacher Involvement in PD Design:** Engage teachers in planning and feedback processes to enhance ownership, satisfaction, and classroom application of PD activities.
8. **Establish Monitoring and Evaluation Frameworks:** Integrate robust evaluation mechanisms to assess PD quality, track implementation, and link outcomes to student learning and teacher growth.
9. **Align PD with Global Benchmarks:** Benchmark PD programs against UNESCO, CEC, and AASEP standards while contextualizing for Pakistan's educational realities and resource limitations.
10. **Policy and Institutional Reforms:** Adopt systemic reforms at the provincial and national levels, ensuring coordination between institutions, standardized frameworks, and resource allocation for sustainable, high-quality PD.

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