



RESEARCH PAPER

Development and Preliminary Validation of the Women College Teachers Professional Development Needs Questionnaire: A Tool for Assessing Continuous Professional Development Practices

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ABSTRACT

This study developed and preliminarily validated the Women College Teachers' Professional Development Needs Questionnaire (WCTPDNQ) and applied it to assess continuous professional development (CPD) practices among women college teachers in Punjab, Pakistan. A pragmatic sequential explanatory mixed-method design was used. Quantitative data were obtained from 300 valid responses from public sector women's colleges in Multan, Dera Ghazi Khan and Bahawalpur divisions after stratified random sampling and data screening. Qualitative data were collected through 30 semi-structured interviews to explain the quantitative patterns. The questionnaire was aligned with Guskey's professional development evaluation logic and comprised five factors: Professional Development Needs, Barriers and Challenges, Institutional Support, Participation in CPD Activities, and Impact on Teaching and Student Outcomes. Fourteen experts reviewed the instrument for content validity. Most domains produced acceptable to high content validity evidence; however, the Barriers and Challenges factor required further item refinement. The overall reliability of the 30-item instrument was excellent (Cronbach's alpha = .935). Descriptive findings showed strong professional development needs (M = 4.02), positive institutional support (M = 3.96), moderate CPD participation (M = 3.71), positive perceived teaching impact (M = 3.89), and noticeable barriers (M = 2.83). Professional Development Needs significantly predicted CPD Participation (beta = .502, R² = .252, p < .001), while Institutional Support strongly predicted Teaching Impact (beta = .737, R² = .544, p < .001). The study concludes that women college teachers recognize strong CPD needs, but institutional structures, flexible access, and gender-sensitive support are required to translate this awareness into sustained professional participation. Further exploration and confirmatory factor analyses are recommended before claiming full construct validation of the WCTPDNQ.

Keywords: Continuous Professional Development, Women College Teachers, Professional Development Needs, Institutional Support, Questionnaire Development, Punjab

Introduction

Continuous Professional Development (CPD) is now widely treated as a central route for improving teacher quality because it links professional learning with subject knowledge, pedagogical judgment, reflective practice, technology integration and student outcomes. Recent studies confirm that there is little evidence of effective professional development being delivered in a single session; effective teacher learning instead involves clear purpose, active learning, learning opportunities, opportunities for practice, feedback and opportunities to work together and learn over time with ongoing institutional support (Sims et al., 2021; Sims et al., 2025). With the advent of the digital age, CPD has gained greater significance, as educators now need not only to keep up with new content and

pedagogical knowledge and skills but also to feel confident in their use of digital spaces, AI, and tools for their practice in an ethical and context-sensitive manner (Amemasor et al. 2025; UNESCO, 2024).

CPD, in the case of women college teachers in the Punjab, has a unique institutional and gendered aspect. Women teachers frequently operate in professional contexts where teaching loads, family responsibilities, and restrictions on travel, as well as cultural norms and differential access to training, impact their professional lives. Existing evidence from international and Pakistan contexts demonstrates the significance of qualified and trained female teachers for enhancing the quality of education and educational participation, especially in the context of conservative societies where experienced female teachers can shape the access to education of girls and their confidence (Barón et al., 2024; Shaheen et al., 2025). Hence, CPD needs to be tailored to women teachers, with evidence-based needs assessment, flexibility in delivery and leadership support, and gender-sensitive institutional arrangements.

This article has been written based on the doctoral research work, Identification of Professional Needs and Guidelines for Continuous Professional Development of Teachers at Women Colleges in Punjab. The uploaded thesis and journal draft demonstrates that the study obtained reliability data on the five factors which was quite strong for the overall reliability of the questionnaire developed which was obtained from 300 women college teachers. There was however a previous article as above stating that it was fully developed and validated, even though the evidence provided was lacking full exploratory factor analysis (EFA), confirmatory factor analysis (CFA), factor loadings, composite reliability, average variance extracted and discriminant validity indices. Due to the potential overstatement of the psychometric evidence, the term preliminary validation is used instead of title term.

The purpose of the study was linked to four purposes. First, it constructed the Women College Teachers' Professional Development Needs Questionnaire (WCTPDNQ) to assess their professional development needs, barriers, institutional support and their participation and perceived teaching impact. Secondly, it evaluated the information about the instrument's content validity and reliability. Thirdly, it examined the empirical trends of CPD requirements and institutional support of women college teachers in Punjab. Fourth, it suggested gender-inclusive practical guidelines for strengthening planning of CPD in public sector women colleges.

Literature Review

Continuous Professional Development and Teacher Improvement

CPD refers to structured and informal professional learning through which teachers update knowledge, improve practice and sustain professional competence. Contemporary reviews emphasize that CPD must be aligned with teachers' classroom realities and should include practical rehearsal, feedback, coaching, peer collaboration and mechanisms for embedding new practices into routine teaching (Sims et al., 2021; Mumtaz et al., 2024; Saleem et al., 2025; Sims et al., 2025). This means that CPD quality cannot be judged only by attendance or satisfaction. A strong CPD system should examine whether teachers learn, whether institutions support the application of new learning, and whether classroom practice and student engagement improve as a result.

Guskey's evaluation model remains highly relevant because it conceptualizes professional development as a sequence from participants' reactions and learning to organizational support, classroom application and student outcomes. Although Guskey's original sources are older than five years, they are retained in this manuscript as foundational sources because the WCTPDNQ is explicitly aligned with that model. Recent

CPD research strengthens the same logic by showing that professional development is most powerful when teacher learning is supported by coherent institutional structures rather than left to individual motivation alone (Amemasor et al., 2025; Sims et al., 2025).

Gender-Sensitive CPD for Women College Teachers

Gender-sensitive CPD recognizes that professional learning is shaped by institutional and social conditions. Programs without consideration for transport, childcare, domestic duties, safety and workload can make attending off-campus or afterschool training more challenging for women teachers. Evidence from policies and development literature in Pakistan underscores the ongoing relevance of qualified female teachers, especially when social norms and local restrictions impact school participation (Barón et al., 2024; Bakht et al., 2026). Contextual policy development, provincial adaptation, improvement of the education systems based on evidence and requiring ongoing review and planning, and strengthening of education systems due to continued review, is also a focus of the National Education Policy Development Framework (Pakistan Institute of Education, 2024).

Hence, an integral part of CPD for a woman teacher is institutional support. Leadership encouragement, flexible timetabling, workload adjustment, financial support, resources, recognition in appraisal, opportunities to use training in teaching. Evidence indicates that while a faculty may have professional motivations for CPD, institutional barriers may prevent them from being engaged in it due to factors such as heavy workload and limited institutional resources (Ahmad et al., 2024; Ansari et al., 2025; Arshad et al., 2025; Riaz et al., 2026). This is no longer a background variable, but an integral part to the effective participation in the CPD process and impact in the classroom.

Digital, AI and Professional Needs of the contemporary world

The professional development of women college teachers now goes beyond the classroom pedagogy to the acquisition of digital skills, the use of artificial intelligence in lesson planning, internet-based assessment, learning management systems and ethical use of technology. UNESCO's AI Competency Framework for Teachers highlights 'AI ethics', 'AI foundations', 'AI pedagogy' and 'AI for professional development and human centered mindset' as key components of teacher learning (UNESCO, 2024).

Empirical studies also demonstrate that technical knowledge is not enough, as teachers must possess pedagogical and ethical knowledge to effectively leverage the use of AI-based tools for teaching (Celik, 2023). AI-focused PD based on Intelligent-TPACK has shown promise of improving teachers' competence with AI in higher education settings (Tan et al., 2025, Shehbaz et al., 2025; Naz et al., 2026; Rashid et al., 2026).

The developments directly contribute to the WCTPDNQ in the following ways: The instrument is not specific to just traditional training needs, it is also designed to assess the need for digital literacy, technology use and classroom application. This ensures that the questionnaire is not just based on the traditional "workshop presence" approach to CPD planning, but is relevant to the current planning of CPD.

Questionnaire Development and Preliminary Validation

Any questionnaire designed for educational planning must have the following characteristics: conceptually clear, easy to read, relevant for respondents and psychometrically defensible. The recent advice on questionnaire development is a systematic development process from construct definition, generation of items, expert review, pilot testing, reliability determination, further validation through factor analysis (where applicable) (Yusoff et al., 2021). It is important to go beyond high internal

consistency in Likert scale development and consider issues of construct clarity, wordings and response format and evidence for validity (Jebb et al., 2021; Ahmad et al., 2025).

Content validity is important, especially in the initial phases of instrument development. Recently, Lawshe's Content Validity Ratio (CVR) was discussed to measure expert opinion on the essentiality of an item for the construct, and further research is seen in the social sciences in terms of its usefulness and limitations (Romero Jeldres et al., 2023). Reliability also is crucial but needs to be viewed with caution. Although high Cronbach's alpha values suggest good internal consistency, it is not enough to establish construct validity or that all subscales are psychometrically acceptable (Izah et al., 2024; Jebb et al., 2021). Because of this, the content validity and overall reliability evidence currently available is reported and overall reliability is not claimed until EFA/CFA and factor level reliability are completed.

Material and Methods

Research Design

A pragmatic sequential explanatory mixed methods design was used in the study. A relevant and structured questionnaire was administered to gather quantitative data, to identify patterns in professional development needs, barriers, institutional support, and participation and perceived impact on teaching. The quantitative patterns were then explained and contextualized through qualitative interviews. Sequential explanatory design is suitable if the results of the numbers need to be interpreted from participants' experiences and interpretations (Toyon, 2021; Venkatesh, 2024).

Population and Sample and Data Screening

The targeted population consisted of women college teachers in public sector women colleges in Multan, Bahawalpur and Dera Ghazi Khan Divisions of Punjab. The sampling description is changed slightly to be consistent with the thesis: Sampling description is changed to stratify random sampling. 360 surveys were sent out to start with. Following data screening and data cleaning, 300 (83.3%) valid responses were retained for the final analysis. Responses to questionnaires that were incomplete or not filled in properly were not accepted. To add depth to analysis of quantitative data, 30 semi-structured interviews were conducted to gather information and data on the subjects of the study; these were used for qualitative data.

Instrument Development

The WCTPDNQ was developed from the thesis literature review, Guskey's professional development evaluation model and the identified domains of women teachers' CPD needs. The final questionnaire contained 30 items on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The instrument contained five factors: Professional Development Needs, Barriers and Challenges, Institutional Support, Participation in CPD Activities, and Impact on Teaching and Student Outcomes. **Table 1** summary the structure of the instrument.

Table 1
Structure of the WCTPDNQ

| Factors | Item numbers | Main purpose in the instrument |
|--------------------------------|--------------|---|
| Professional Development Needs | 1-6 | Identifies training needs in pedagogy, technology, classroom management, subject knowledge, career growth and assessment. |

| Factors | Item numbers | Main purpose in the instrument |
|---|--------------|--|
| Barriers and Challenges | 7-12 | Measures family, cultural, scheduling, location, childcare and workload barriers that restrict CPD access. |
| Institutional Support | 13-18 | Assesses opportunities, flexible schedules, financial support, leadership encouragement, local access and recognition. |
| Participation in CPD Activities | 19-24 | Measures engagement with CPD, classroom application, confidence, motivation, professional growth and preference for continuous training. |
| Impact on Teaching and Student Outcomes | 25-30 | Assesses perceived improvement in teaching quality, student engagement, technology use, learning outcomes, and job satisfaction and student success. |

Validity, Reliability and Data Analysis

Content validity was examined through expert review. Fourteen experts evaluated the questionnaire items, and CVR/CVI values were computed. For a 14-member expert panel, items were interpreted against the recommended critical level of approximately 0.51. This corrects the earlier inconsistency in which the expert count and the cut value were not aligned. The analysis therefore distinguishes between factors with acceptable content validity and the Barriers and Challenges factor, which require further refinement.

Quantitative data were analyzed using SPSS. Descriptive statistics, Pearson correlation and simple linear regression were used to address the research objectives. Qualitative interview data were analyzed thematically to explain the survey patterns. Because complete EFA/CFA results were not available in the supplied thesis/article evidence, this manuscript does not report invented factor loadings or model-fit indices. Instead, it presents an honest preliminary validation and identifies EFA/CFA as the next necessary psychometric stage.

Results and Discussion

Table 2
Demographic Profile

| Ages | 25-30 years | 30-35 years | Above 35 years | Profession |
|------------|----------------|--------------|----------------|---|
| Percentage | n = 290, 96.7% | (n = 6, 2.0% | n = 4, 1.3% | All respondents teacher at women's college. |

All 300 valid respondents were women teachers working in women's colleges. The majority were aged 25-30 years (n = 290, 96.7%), followed by 30-35 years (n = 6, 2.0%) and above 35 years (n = 4, 1.3%). All respondents held the professional designation of teacher at women's college. This homogeneous profile strengthens the relevance of the findings for the target group but limits generalization beyond women college teachers in the selected divisions.

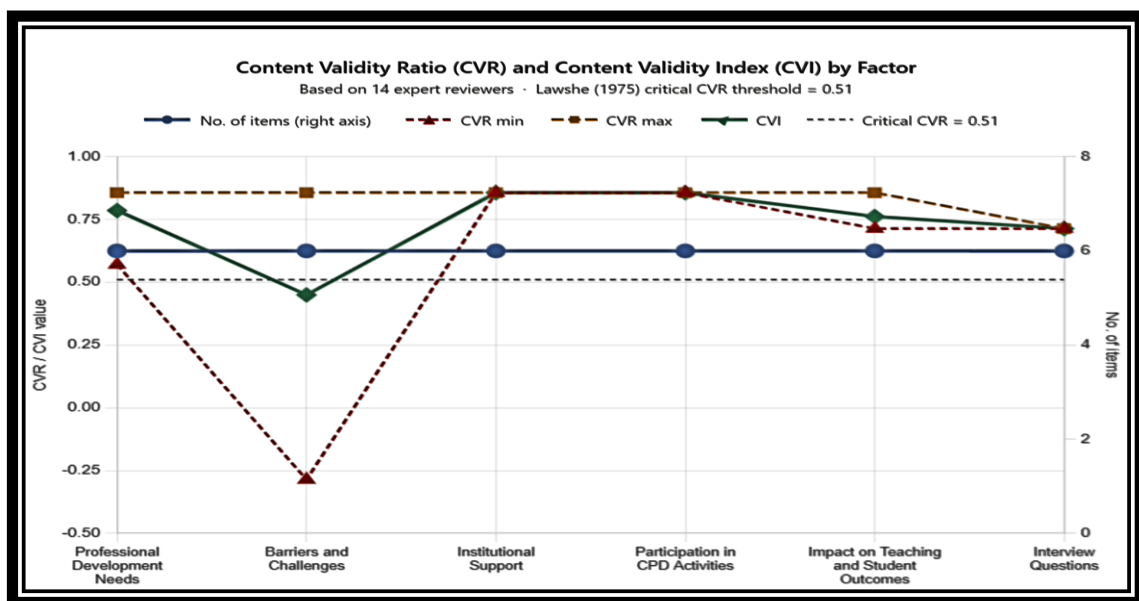
Content Validity Evidence

Table 3
Corrected CVR/CVI summary based on 14 expert reviewers

| Factor | No. of items | CVR range | CVI | Corrected decision |
|--------------------------------|--------------|---------------|------|--|
| Professional Development Needs | 6 | .571 to .857 | .786 | Acceptable/high content validity; retain items. |
| Barriers and Challenges | 6 | -.286 to .857 | .450 | Needs revision; weak items should be reworded and revalidated. |
| Institutional Support | 6 | .857 | .857 | High content validity; retain items. |

| | | | | |
|---|---|--------------|------|--|
| Participation in CPD Activities | 6 | .857 | .857 | High content validity; retain items. |
| Impact on Teaching and Student Outcomes | 6 | .714 to .857 | .762 | Acceptable/high content validity; retain items. |
| Interview Questions | 6 | .714 | .714 | Acceptable content validity for qualitative guide. |

Table 3 and Figure 1 present the corrected content validity summary. Most factors demonstrated acceptable to high content validity. Professional Development Needs, Institutional Support, Participation in CPD Activities, Impact on Teaching and Student Outcomes, and the interview questions exceeded acceptable levels. However, the Barriers and Challenges factor produced a weaker CVI (.450), indicating that some items need rewording and revalidation before the instrument is treated as fully validated.



Participation in CPD Activities

- No. of items: 6.000
- CVR min: 0.857
- CVR max: 0.857
- CVI: 0.857

Figure 1 Corrected CVR/CVI summary based on 14 expert reviewers

Reliability Evidence

Table 4
Reliability evidence for WCTPDNQ

| Tool | No. of items | Cronbach alpha | Interpretation |
|---|----------------|--------------------------------|--|
| Women College Teachers Professional Development Needs Questionnaire (WCTPDNQ) | 30 | .935 | Excellent overall internal consistency. |
| Factor-level reliability | Five subscales | Not reported in available data | Recommended for the next validation stage; no values should be invented. |

The overall WCTPDNQ produced excellent internal consistency, with Cronbach's alpha = .935 across 30 items. This helps to ensure the validity of the full instrument. But the evidence for factor level Cronbach's alpha values was not reported. The corrected

manuscript consequently avoids from the making up of subscale reliability values, and suggests that the alpha, composite reliability and omega measures are to be reported during the next round of validation Shown in Table 3.

Descriptive Statistics of Study Factors

Table 5
Descriptive statistics for five study factors

| Variable | Mean | SD | N | Interpretive meaning |
|---|--------|--------|-----|--|
| Professional Development Needs | 4.0219 | .49009 | 300 | Strong need recognition. |
| Barriers and Challenges | 2.8342 | .61240 | 300 | Noticeable barriers; interpretation depends on item direction. |
| Institutional Support | 3.9604 | .50638 | 300 | Generally positive support. |
| Participation in CPD Activities | 3.7058 | .53164 | 300 | Moderate engagement; lower than need recognition. |
| Impact on Teaching and Student Outcomes | 3.8905 | .55011 | 300 | Positive perceived impact. |

The descriptive result in Table 5 indicates that teachers felt high needs for their professional development, high level of support by the institution, high level of the impact on their teaching, while low level of participation in CPD activities. Pattern: need-participation gap - women teachers understand the significance of professional learning but participation is not as robust as it could be if the need were met. Barriers and Challenges had the lowest mean; interpretation depends on the direction of the items, but the factor showed a significant amount of barriers in the access and participation process.

Correlation Analysis

Table 6
Pearson correlation matrix. Note. ** $p < .01$ (two-tailed), $N = 300$

| Variable | PD Needs | Barriers | Institutional Support | CPD Participation | Teaching Impact |
|-----------------------|----------|----------|-----------------------|-------------------|-----------------|
| PD Needs | 1 | -.423** | .639** | .502** | .611** |
| Barriers | -.423** | 1 | -.398** | -.441** | -.389** |
| Institutional Support | .639** | -.398** | 1 | .493** | .737** |
| CPD Participation | .502** | -.441** | .493** | 1 | .661** |
| Teaching Impact | .611** | -.389** | .737** | .661** | 1 |

In Table 6 Pearson correlation analysis showed statistically significant relationships among all five factors at $p < .01$. The findings for PDN had a positive correlation with Institutional Support and CPD Participation and Teaching impact. Barriers and Challenges were negatively correlated with the other factors, meaning that increased barriers were linked to a decrease in support, involvement and perceived impact. The highest level of correlation was to be found between institutional support and teaching impact ($r = .737$), followed by CPD participation and teaching impact ($r = .661$).

Regression Analysis

Table 7
Summary of regression models

| Model | Predictor | Outcome | B | Beta | R ² | F | p | Meaning |
|-------|--------------------------------|-------------------|------|------|----------------|---------|--------|--|
| 1 | Professional Development Needs | CPD Participation | .544 | .502 | .252 | 100.180 | < .001 | Need recognition predicts participation. |
| 2 | Institutional Support | Teaching Impact | .801 | .737 | .544 | 355.035 | < .001 | Support strongly predicts teaching impact. |

In Table 6 Two regression models were kept as they were supported by evidence found in the articles available. In Model 1, the amount of variance in CPD Participation was 25.2% accounted for by Professional Development Needs. The impact of Institutional Support was strong in Model 2 in predicting Impact on Teaching and Student Outcomes, accounting for 54.4% of the variance. The second model had the strongest effect and was able to confirm that institutional support was a significant factor in the teacher's perception of improvement in teaching that resulted from CPD.

Qualitative Findings

Themes emerged which aligned with the quantitative structure of the WCTPDNQ: professional development needs and skill enhancement priorities; barriers to participation in CPD; institutional support and resources available; teachers' experiences of participation in CPD; and impact of CPD and future improvement. Teachers highlighted the importance of the modern approach to education, digital literacy, AI-driven teaching, assessment techniques, leadership development, and mentoring and hands-on strategies in the classroom. They also found workload, time, travel, financial stress, family demands and little institutional planning to be factors that limit participation.

Qualitative evidence elucidates why PD needs were high or more complex but participation rates were moderate. The design, location, timing and institutional support provided for CPD activities were not barriers for teachers to pursue CPD as this was not what they were rejecting. This finding strengthens not only the call for training content change for CPD but also for accesses, flexibility, follow up and institutional accountability.

Discussion

The revised results reveal that the awareness of professional development needs among the women college teachers in Punjab is high. This is consistent with the current literature on CPD (Sims et al., 2021; Sims et al., 2025) that emphasises teacher learning best when it is in response to real classroom needs and is nurtured over time. Powered by teachers, needs identified for teaching methods and digital tools as well as classroom management and assessment, and career development and subject knowledge were identified, such that a broad approach to CPD planning was required to cover both instructional and career development needs.

The need-participation gap is the most crucial interpretive output. Professional Development Needs had a mean of 4.02 and the mean of Participation in CPD Activities was 3.71. The gap of 0.31 means that awareness doesn't necessarily lead to participation. This reinforces the findings of the research that CPD engagement is dependent upon enabling factors such as flexible scheduling, relevance of content, accessibility to training, workload management and recognition. These are important issues for women teachers, for whom participation could be influenced by domestic duties or by hindrances to mobility and institutional planning.

Institutional Support was the most significant predictor for Teaching Impact. The result of the regression showed (beta = .737; $R^2 = .544$; $p < .001$) that over half of the variance of the perceived teaching impact was explained by support. Very useful practical discovery. It implies that CPD will have meaning for improving teaching only if colleges take the trouble to create arrangements and encourage teachers to apply learning and not just attend some random events and workshops. These structures include leadership encouragement, protected time, accessible resources, financial support, peer mentoring and follow-up evaluation.

The results also reveal the need for digital and AI specific professional development to be part of the upcoming CPD policy. International frameworks and empirical studies have

pointed out the importance of ethical, pedagogical and technical knowledge in the use of AI by teachers (Celik 2023; Tan et al., 2025; UNESCO 2024). For this reason, the women college teachers of Punjab should be imparted with practical training of the learning management systems by the relevant authorities, digital assessment, AI for lesson planning, system of student feedback, and responsible use of generative AI.

The WCTPDNQ appears to be a promising tool for validation purposes, though it is a need to strengthen psychometrically in this area. Level of overall reliability was excellent and most factors had acceptable/high content validity. The Barriers and Challenges factor, however, needs to be revised and full construct validation is not possible without EFA/CFA and factor-level reliability. This is a prudent reading, better than an agenda-setting reading of the results. It also gives a clear blueprint for the next level in publication, that of revising weak items and revalidating with experts, carrying out EFA on one sample and CFA on an independent one, and reporting convergent and discriminant validity.

Proposed Gender-Sensitive CPD Guidelines for Women Colleges in Punjab

Table 8
Proposed CPD guidelines

| Guideline area | Recommended action | Expected benefit |
|------------------------------|---|---|
| Needs assessment | Use the WCTPDNQ annually to identify priority training domains before designing CPD calendars. | Training becomes evidence-based and aligned with teachers actual needs. |
| Flexible delivery | Offer blended, on-campus and working-hours CPD options. | Reduces travel, time and domestic responsibility barriers. |
| Institutional support | Allocate CPD budgets, provide workload adjustment and recognize CPD completion in appraisal or promotion discussions. | Converts teacher motivation into sustained participation. |
| Mentorship and peer learning | Create peer circles linking senior and junior teachers for classroom observation, reflection and resource sharing. | Supports application of new learning beyond workshops. |
| Digital and AI literacy | Provide practical training on educational technologies, learning management systems, digital assessment and ethical AI-assisted teaching. | Improves technology integration and prepares teachers for current classroom expectations. |
| Monitoring and follow-up | Evaluate CPD through teacher feedback, classroom application evidence and student engagement indicators. | Connects CPD participation with teaching improvement and student outcomes. |

In Table 8 the following CPD guidelines are suggested based on the quantitative and qualitative findings. These are expressed in action, rather than generic suggestions, to enable college administrators, provincial departments and CPD designers to utilize them in practice.

Conclusion

This article developed and preliminarily validated the WCTPDNQ with a focus to the investigation of CPD Practice of women college teachers in the Punjab. The overall internal consistency and most of the content validities of the instrument from the evidence are good. Still, the Barriers and Challenges factor; however, it needs to be further item refined, and for completing construct validation, EFA/CFA should be performed prior to the instrument being considered fully validated.

The substantive Findings are clear. Women college teachers understand and feel a sense of need for CPD and have a clear sense of good professional development needs. However, participation is lower than need recognition due to barriers which include workload, time, access, travel, family responsibilities and institutional planning. The role of institutional support is most correlated with teaching impact, so the effectiveness of CPD programs relies on leadership, resources, flexibility and follow-up. The study hence proposes a gender-sensitive CPD model, which features annual needs assessment, flexibility

in delivery, institutional funding, mentoring, digital literacy training and AI literacy training, and a systematic monitoring.

Limitations and Future Validation

The main constraint is that the content of the literature reported in the thesis/articles is reported as expert robust and content, but it does not provide a complete exploratory factor analysis, confirmatory factor analysis, and Cronbach alpha at the level of the factors, composite reliability, average variance extracted and discriminant validity indices. Hence, it is better to state that the instrument is "preliminarily validated" than "fully validated" Future studies might consider the following revisions to the weak Barriers and Challenges items, a second expert review, piloting the revised items, and then conducting EFA and CFA with independent samples.

Another constraint is that the results are only for female teachers from some of the divisions of Punjab, and the self-reported perceptions of the impact of teaching and students' outcomes are the primary bases for the findings. Future research should involve classroom observations, student feedback, student outcomes over time, and administrative student outcomes, to gauge the impact of CPD on long-term teacher learning and improvement, to see how and if student outcomes change as a result of teachers' involvement in CPD, and to determine how and whether administrative student outcomes change due to teacher participation in CPD.

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