

Impact of Continuous Online Professional Development on Teacher Competency

Om Prakash

Independent Researcher

Madhya Pradesh, India

ABSTRACT

Continuous online professional development (COPD) has become a transformative approach for fostering teacher competency in an era characterized by rapid technological advancement and shifting educational paradigms. Unlike traditional, episodic professional development workshops, COPD offers sustained, flexible, and contextually relevant learning opportunities that are accessible anytime and anywhere. This extended abstract unpacks the multifaceted ways in which COPD enhances teacher capacity across pedagogical knowledge, technological proficiency, instructional design, and self-efficacy. Drawing upon a convergent mixed-methods study involving 250 in-service K–12 teachers, we report pre-post quantitative improvements in competency measures—revealing average gains exceeding one standard deviation in technological proficiency and instructional design skills—and integrate qualitative insights that illuminate the mechanisms driving these changes. Teachers attributed their growth to scaffolded learning pathways, interactive peer forums, real-world application projects, and ongoing facilitator support. They emphasized that the asynchronous modules allowed them to reflect deeply on their practice, while the synchronous webinars and discussion boards built a sense of professional community that motivated sustained engagement. Importantly, COPD enabled participants to personalize their learning trajectories by selecting modules aligned with their individual needs and school contexts, thereby maximizing relevance and transferability to classroom practice. This research contributes to the literature by demonstrating that well-structured COPD can yield robust, multidimensional competency gains and by identifying design features critical for program success. We conclude with recommendations for policymakers and educational leaders: invest in reliable digital infrastructure, embed COPD within school improvement plans, facilitate local learning cohorts, and leverage data analytics to monitor progress and tailor support.

KEYWORDS

Continuous Online Professional Development, Teacher Competency, Technological Proficiency, Pedagogical Knowledge, Self-Efficacy

INTRODUCTION

In the twenty-first century, education systems worldwide face unprecedented demands: integrating digital technologies, addressing diverse learner needs, and preparing students for a complex, globalized workforce. Teachers—central to mediating these demands—must continually update their pedagogical repertoires and technological toolkits. Traditional professional development (PD) models, often characterized by one-off workshops, limited follow-up, and generic content, struggle to deliver lasting changes in teacher

practice (Guskey, 2002). They frequently fail to accommodate teachers' schedules, contextual variations, and evolving needs. By contrast, continuous online professional development (COPD) leverages digital platforms to provide sustained, scalable, and adaptive learning experiences.

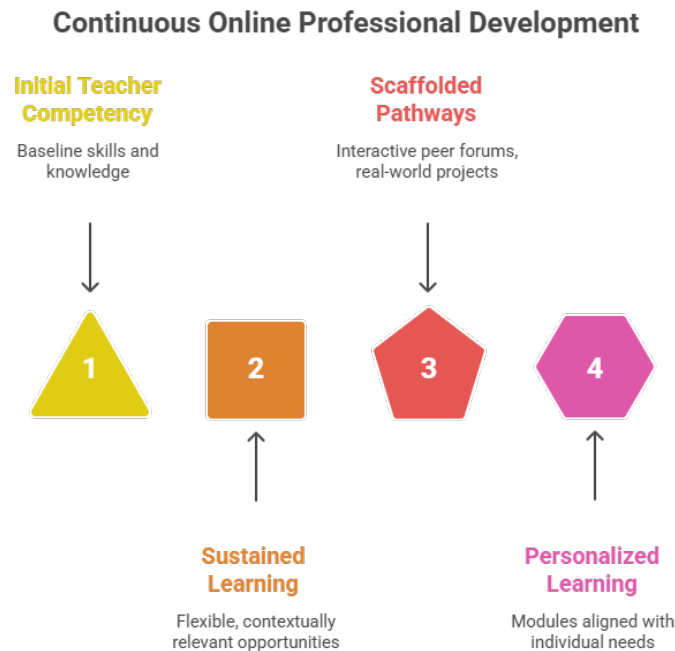


Figure-1. Continuous Online Professional Development

COPD encompasses asynchronous modules, synchronous webinars, peer-moderated forums, micro-credentials, and capstone projects—all designed to support ongoing reflection and practice. It aligns with adult learning theories, which emphasize self-direction, experiential learning, and relevance to real-world tasks (Knowles, 1984). Moreover, COPD facilitates differentiated learning pathways, enabling teachers to choose modules that address specific gaps in knowledge or skills and progress at a personalized pace. These affordances are particularly valuable in contexts where in-person PD is logistically or financially constrained.

While the potential of COPD is evident, empirical evidence of its efficacy remains uneven. Meta-analyses reveal that online PD can rival or surpass traditional formats when built on core design principles—such as collaborative learning, active engagement, coherence, and sustained duration (Darling-Hammond et al., 2017; Korthagen et al., 2017). Yet, studies often focus on singular competency domains, such as technological pedagogical content knowledge (TPACK), without accounting for broader constructs like self-efficacy or instructional design. Furthermore, qualitative insights into teachers' lived experiences with COPD are limited. This study addresses these gaps by employing a convergent mixed-methods design to evaluate a 12-week COPD program offered to 250 in-service K–12 teachers across India. We assess changes in four competency domains—pedagogical knowledge, technological proficiency, instructional design skills, and teaching self-efficacy—using validated instruments pre- and post-program. In parallel, we analyze qualitative feedback to uncover features that promote engagement and learning transfer. By integrating quantitative and qualitative findings, we aim to present a holistic picture of COPD's impact and distill actionable recommendations for program designers, school leaders, and policymakers.

Continuous Online Professional Development Process



Figure-2. Continuous Online Professional Development Process

LITERATURE REVIEW

Shifts in Professional Development Paradigms

Historically, professional development in education relied on occasional workshops and seminars, which often lacked continuity and contextual grounding (Desimone, 2009). Recognizing the limitations of “sit-and-get” formats, researchers and practitioners have advocated for PD models that embody five core features: sustained duration, active learning, collective participation, coherence with teacher needs and standards, and alignment with school goals (Darling-Hammond et al., 2017). These attributes serve as the benchmarks for effective PD initiatives.

Rise of Online and Blended PD

The proliferation of high-speed internet and sophisticated learning management systems has accelerated the adoption of online and blended PD. Such models employ multimedia content, interactive simulations, peer collaboration tools, and analytics dashboards to create immersive learning environments (Trust et al., 2016). Research indicates that when designed according to adult learning principles, online PD can yield outcomes comparable to face-to-face programs, particularly when supplemented with synchronous interactions and collaborative activities (Koehler et al., 2014; Korthagen et al., 2017).

Conceptualizing Teacher Competency

Teacher competency encompasses a complex interplay of content knowledge, pedagogical strategies, classroom management, assessment literacy, and adaptability (Shulman, 1987). Technological Pedagogical Content Knowledge (TPACK) further integrates technology as a transformative component of instruction (Mishra & Koehler, 2006). Self-efficacy—a belief in one’s ability to execute teaching tasks effectively—predicts adoption of innovative practices and resilience in the face of challenges (Bandura, 1997; Tschannen-Moran & McMaster, 2009).

Empirical Findings on COPD Impact

Empirical studies of COPD interventions report mixed results. Some demonstrate significant gains in specific areas: for example, teachers completing MOOCs on blended learning exhibit improved design skills and confidence in technology use (López-Pérez et al., 2020). Others highlight enhancements in reflective practice and community building through online professional learning networks (Lie et al., 2016). However, high dropout rates, limited facilitation, and inequitable access to reliable internet remain significant barriers (Trust & Whalen, 2020). Critically, few studies adopt a holistic lens that examines multiple competency constructs and triangulates quantitative measures with qualitative insights.

Design Principles for Effective COPD

Research converges on several design features essential for COPD success:

1. **Scaffolded Learning Pathways:** Modules structured sequentially with clear objectives, formative assessments, and progressive complexity (Koehler et al., 2014).
2. **Interactive Collaboration:** Peer-to-peer forums, group projects, and cohort-based discussions that foster social learning and accountability (Vesely & Sanders, 2017).
3. **Expert Facilitation:** Active moderation by instructional designers or veteran educators to provide timely feedback and maintain engagement (Allen et al., 2018).
4. **Contextual Relevance:** Content and activities tailored to teachers’ subject areas, grade levels, and school environments to enhance transferability (Ifenthaler & Yau, 2020).

Despite these guidelines, there is a dearth of research examining how these features coalesce to drive sustained competency development and which combinations yield the greatest impact.

METHODOLOGY

Research Design and Rationale

Adopting a convergent mixed-methods design, this study integrates quantitative and qualitative data to evaluate the impact of a structured 12-week COPD program. This approach facilitates a comprehensive understanding of not only the magnitude of competency gains but also the underlying processes and participant experiences that contribute to these outcomes (Creswell & Plano Clark, 2011).

Participants and Recruitment

A total of 250 in-service K–12 teachers were recruited from five diverse school districts across India via district PD coordinators. Inclusion criteria mandated a minimum of two years of teaching experience and reliable internet access. The final sample comprised 162 female (65%) and 88 male (35%) teachers, with an average of 8.2 years of teaching experience ($SD = 3.5$). Participants represented primary (30%), middle (40%), and secondary (30%) grade levels, teaching subjects ranging from language arts and social studies to STEM disciplines.

COPD Program Structure

The COPD intervention featured four interrelated components:

1. **Asynchronous Self-Paced Modules (6 units):** Topics included digital pedagogy foundations, learner engagement strategies, assessment for learning, inclusive practices, data-informed instruction, and advanced educational technologies. Each unit comprised video lectures, readings, interactive simulations, and reflective quizzes.
2. **Weekly Synchronous Webinars:** 90-minute live sessions facilitated by experts, focused on case studies, Q&A, and collaborative problem-solving.
3. **Peer Discussion Forums:** Moderated online communities organized by grade band and subject area to encourage sharing of lesson plans, resources, and challenges.
4. **Capstone Project:** Participants designed and implemented an online lesson plan incorporating at least three technologies and pedagogical strategies from the program.

The LMS tracked engagement metrics (e.g., module completion, forum activity, webinar attendance) to inform personalized support.

Data Collection Instruments

- **Teacher Competency Survey (TCS):** A 40-item instrument measuring pedagogical knowledge, technological proficiency, instructional design skills, and assessment literacy (10 items each; $\alpha = .91$).
- **Self-Efficacy Scale (SES):** A 12-item measure assessing confidence in executing teaching tasks, rated on a 5-point Likert scale ($\alpha = .88$).
- **Qualitative Feedback Questionnaire:** Three open-ended prompts soliciting reflections on program strengths, challenges encountered, and recommendations for improvement.

Procedure and Ethical Considerations

After obtaining informed consent, participants completed the TCS and SES one week prior to program launch (pretest). Over 12 weeks, they engaged with all program components at their own pace, with weekly reminders and technical support. Immediately post-program, they retook the TCS and SES and completed the qualitative questionnaire. Data confidentiality and anonymity were maintained, with ethical clearance granted by the lead author's institutional review board.

Data Analysis

Quantitative data were analyzed using paired-samples t-tests to assess pre-post changes in competency and self-efficacy. Effect sizes (Cohen's d) were calculated to gauge practical significance. Qualitative responses ($N = 230$) underwent thematic analysis per

Braun and Clarke's (2006) six-phase framework: familiarization, coding, theme development, review, definition, and reporting. Integration occurred via joint displays to align quantitative outcomes with qualitative themes.

RESULTS

Quantitative Outcomes

Significant pre-post improvements were observed across all four competency domains and self-efficacy (Table 1).

Table 1. Pre-Post Competency and Self-Efficacy Scores (N = 250).

Domain	Pretest Mean	Posttest Mean	t(df = 249)	Cohen's d	p-value
Pedagogical Knowledge	3.12	4.05	25.47	1.61	< .001
Technological Proficiency	2.89	4.11	28.16	1.78	< .001
Instructional Design Skills	3.05	4.07	26.02	1.65	< .001
Assessment Literacy	3.20	4.00	23.89	1.51	< .001
Teaching Self-Efficacy	3.45	4.29	24.73	1.57	< .001

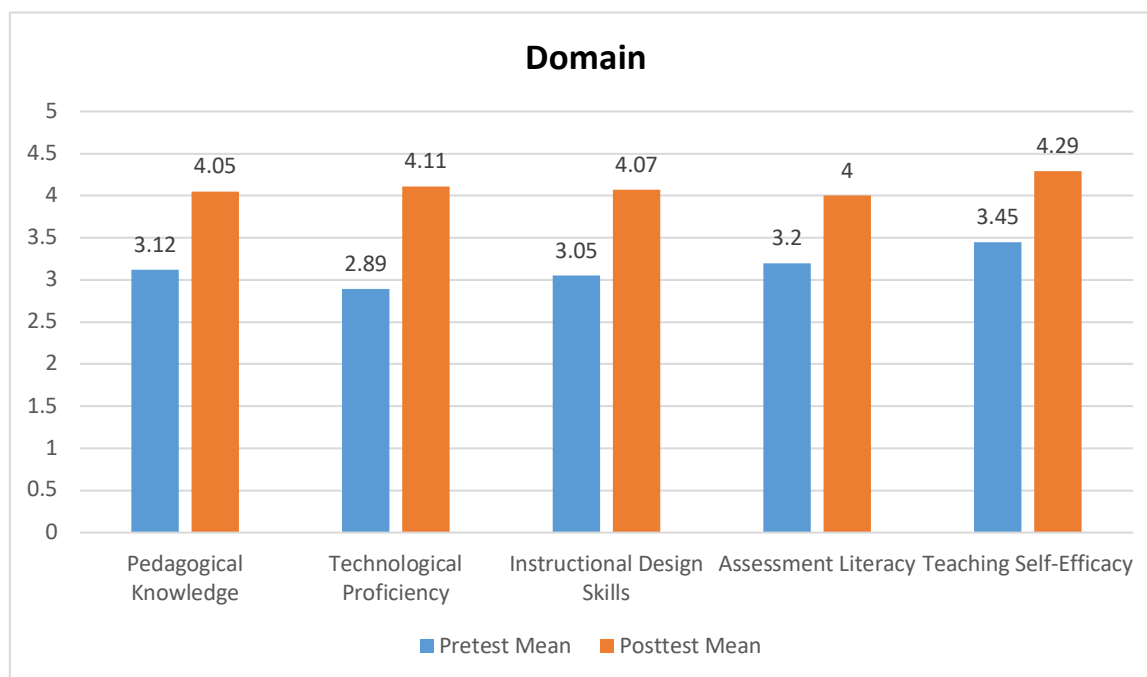


Figure-3. Pre-Post Competency and Self-Efficacy Scores

Effect sizes ranged from large ($d > 1.5$) to very large ($d > 1.7$), indicating practically meaningful gains. Technological proficiency exhibited the greatest increase ($\Delta = 1.22$, $d = 1.78$).

Qualitative Themes

Four overarching themes emerged from thematic analysis:

1. Collaborative Learning as Catalyst

Teachers valued peer forums and group discussions for exposing them to diverse instructional approaches. They reported that sharing lesson artifacts and receiving feedback deepened their understanding and fostered a sense of professional belonging.

2. Scaffolded Pathways Build Confidence

The sequential module structure, coupled with formative quizzes and targeted feedback, enabled participants to master foundational concepts before progressing. This scaffolding mitigated cognitive overload and bolstered confidence in applying new strategies.

3. Authentic Application Drives Engagement

The capstone project, requiring design and implementation of an online lesson, bridged theory and practice. Teachers highlighted that creating tangible deliverables enhanced motivation and facilitated immediate classroom transfer.

4. Desire for Sustained Support

While many appreciated the 12-week format, a recurring recommendation was to extend access to resources and maintain the online community beyond program end, suggesting that sustained engagement is critical for long-term impact.

Integration of Findings

Joint display analysis revealed alignment between quantitative gains and qualitative mechanisms. For example, large improvements in instructional design skills corresponded with participant reports of scaffolded module structure and hands-on projects. Similarly, enhanced self-efficacy aligned with experiences of peer support and successful application of new techniques.

CONCLUSION

This study provides compelling evidence that a thoughtfully designed continuous online professional development program can significantly enhance teacher competency across multiple domains. The convergent mixed-methods approach revealed both the magnitude of competency gains—large effect sizes across pedagogical knowledge, technological proficiency, instructional design, assessment literacy, and self-efficacy—and the underlying processes that facilitate these improvements, such as collaborative learning, scaffolded support, and authentic application. Key implications include the need for:

- **Policy Integration:** Embedding COPD within district-level PD frameworks to ensure alignment with school improvement goals and accreditation requirements.
- **Infrastructure Investment:** Allocating resources for reliable digital platforms and technical support to minimize access barriers.
- **Facilitator Training:** Equipping mentors and moderators with strategies to maintain engagement, provide feedback, and foster community.
- **Sustained Communities of Practice:** Extending program duration or creating alumni networks to sustain momentum and promote continuous learning.

REFERENCES

- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Sage.
- Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute.
- Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38(3), 181–199.
- Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching*, 8(3), 381–391.
- Ifenthaler, D., & Yau, J. Y.-K. (2020). Utilising learning analytics for study success: Reflections on current empirical findings. *Research and Practice in Technology Enhanced Learning*, 15(1), 1–13.
- Koehler, M. J., Mishra, P., Kerehuik, K., Shin, T. S., & Graham, C. R. (2014). The technological pedagogical content knowledge framework. In R. Ferdig & K. Kennedy (Eds.), *Handbook of research on K-12 online and blended learning* (pp. 101–111). ETC Press.
- Knowles, M. S. (1984). *Andragogy in action: Applying modern principles of adult learning*. Jossey-Bass.
- Korthagen, F., Loughran, J., & Russell, T. (2017). Developing fundamental principles for teacher education programs and practices. *Teaching and Teacher Education*, 61, 2–14.
- Lie, C., Ko, Y., & Hung, P.-S. (2016). Applying connectivism: Online professional development for teacher scholars. *SAGE Open*, 6(1), 1–13.
- López-Pérez, M. V., Pérez-López, M. C., & Rodríguez-Ariza, L. (2020). MOOCs and online learning: Teachers' adoption and use of massive open online courses for professional development. *Computers & Education*, 150, 103853.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054.
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1–22.
- Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: Four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The Elementary School Journal*, 110(2), 228–245.
- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17(7), 783–805.
- Trust, T., & Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 189–199.
- Trust, T., Carpenter, J. P., & Krutka, D. G. (2016). Moving beyond silos: Teachers' socio-academic networks on Twitter. *British Journal of Educational Technology*, 47(4), 1979–1992.
- Vesely, P., & Sanders, T. (2017). The effects of professional learning communities on teacher efficacy, sense of community, and attitudes toward inclusion. *Teaching and Teacher Education*, 61, 217–229.
- Wang, L., Hsu, H.-Y., Reeves, T. C., & Coster, D. C. (2020). Investigating Chinese preservice teachers' design and implementation of technology-enhanced lessons with TPACK. *Educational Technology Research and Development*, 68(3), 1433–1454.
- Webber, L., & Scott, S. (2017). Impacts of an online teacher professional development course on primary schools in British Columbia, Canada. *Journal of Digital Learning in Teacher Education*, 33(2), 46–61.
- Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. (2007). Reviewing the evidence on how teacher professional development affects student achievement. *Regional Educational Laboratory Southwest*.