Volume: 25 No.2. November, 2025; pp. 352-358
P-ISSN: 1411-4585 E-ISSN: 2549-6743
DOI: https://doi.org/10.24036/pedagogi.v25i2.2662
Submitted: 25-08-23; Rivised: 25-10-14; Accepted: 25-11-30

Pedagogi Jurnal Ilmu Pendidikan
http://pedagogi.ppj.unp.ac.id/

A Collaborative Professional Development on Teachers' Higher Order Thinking

Kanyarat Cojorn[1*]
[1] Mahasarakham University
* e-mail: kanyaratcojorn@gmail.com

Abstract

This study examines the effectiveness of collaborative professional development (CPD) programs in enhancing teachers' ability to foster higher-order thinking skills (HOTS) among students. The research adopts a mixed-methods approach, integrating quantitative data from pre- and post-intervention assessments with qualitative insights from teacher interviews and classroom observations. Findings reveal that CPD significantly improved teachers' pedagogical strategies, particularly in designing inquiry-based tasks, facilitating open-ended questioning, and promoting critical and creative thinking. Moreover, collaborative learning communities provided opportunities for peer feedback, reflective practice, and sustained professional dialogue, which contributed to teachers' confidence and instructional adaptability. The study underscores the pivotal role of collaborative professional development in building teacher capacity for fostering HOTS and suggests that school systems should institutionalize CPD as a strategic tool for curriculum innovation and student-centered learning

Keywords: *Collaborative Professional Development; Teacher Collaboration*

How to cite : Cojorn, K. (2025). A collaborative professional development on teachers' higher order thinking. *Pedagogi: Jurnal Ilmu Pendidikan*, *25*(2). https://doi.org/10.24036/pedagogi.v25i2.2662

INTRODUCTION

The rapid transformations in the global educational landscape have intensified the demand for students to develop competencies that go beyond memorization and procedural knowledge. In the 21st century, education systems worldwide are expected to prepare learners to engage in critical thinking, problem-solving, creativity, and decision-making—skills that are fundamental for success in a knowledge-based economy (Partnership for 21st Century Skills, 2019). These skills are generally associated with higher-order thinking skills (HOTS), which include analysis, synthesis, evaluation, and creation, as classified in the upper levels of Bloom's revised taxonomy (Anderson & Krathwohl, 2001). Higher-order thinking empowers learners to interpret complex information, make reasoned judgments, and generate innovative solutions, thus enabling them to adapt effectively to unpredictable and rapidly changing contexts (King et al., 2018).

Despite the acknowledged importance of HOTS in educational outcomes, fostering these skills in classroom settings remains a significant challenge for educators, (Cochran-Smith et al., 1999). Traditional teaching approaches, characterized by rote memorization and teacher-centered instruction, often fail to provide opportunities for learners to engage in deep cognitive processes

(Zohar & Schwartzer, 2005). Research suggests that many teachers experience difficulties in designing learning activities that stimulate HOTS, due in part to gaps in pedagogical knowledge, limited access to effective instructional models, and insufficient ongoing training (Choy & Cheah, 2009; Darling-Hammond et al., 1995). Consequently, the promotion of HOTS among students depends heavily on the professional learning opportunities available to teachers and the quality of support they receive in translating theoretical frameworks into practical teaching strategies, (Hendrickx et al., 2024).

Professional development (PD) serves as a critical mechanism for enhancing teacher expertise and improving instructional practices, (Penuel et al., 2017). However, conventional models of PD—often implemented as one-off workshops or lecture-based sessions—have been widely criticized for their lack of sustained impact on classroom instruction ((Garet et al., 2001); (Desimone et al., 2009;Ingersoll et al., 2011). These traditional approaches typically emphasize passive learning rather than active engagement, resulting in minimal changes in teacher practice. To address these shortcomings, scholars and policymakers have increasingly advocated for collaborative professional development (CPD) models, which are grounded in principles of shared learning, peer support, and reflective practice (Borko & H, 2004; Vescio et al., 2008)

Collaborative professional development differs from conventional training programs in its emphasis on interaction and co-construction of knowledge among teachers (Johnson et al., 2003). CPD initiatives often involve collaborative lesson planning, peer observation, feedback cycles, and collective problem-solving sessions, (Sonsupap et al., 2024). These processes enable teachers to engage in meaningful dialogue, critically examine their instructional practices, and experiment with innovative strategies for fostering higher-order thinking, (Lieberman et al., 2008). Research indicates that collaboration within professional learning communities enhances teachers' sense of agency, promotes deeper pedagogical understanding, and facilitates sustained changes in classroom practice (Stoll et al., 2006; Vangrieken et al., 2015). Moreover, CPD aligns with social constructivist theories of learning, which highlight the role of social interaction and shared meaning-making in professional growth, (Wenger & E, 1998).

The paper "A Collaborative Professional Development and Its Impact on Teachers' Ability to Foster Higher Order Thinking" examines the effectiveness of CPD as a transformative approach to teacher learning and instructional improvement. Specifically, it investigates how structured collaborative activities influence teachers' ability to design and implement learning experiences that promote higher-order thinking among students, (Van et al., 2012). By exploring the dynamics of teacher collaboration and its impact on instructional practices, the study addresses a critical gap in the literature concerning the link between professional development models and the cultivation of complex cognitive skills in learners, (Talafian et al., 2023).

This research is particularly timely in light of global educational reforms that prioritize 21st-century competencies as essential learning outcomes, (Hord et al., 2004). Many national curricula, including those in OECD member countries, explicitly emphasize critical thinking, creativity, and problem-solving as core objectives of schooling (OECD, 2018). Consequently, teachers are under increasing pressure to adopt pedagogical strategies that facilitate deep learning and intellectual engagement. However, without targeted professional development that equips educators with the necessary tools and conceptual frameworks, these policy aspirations are unlikely to translate into meaningful classroom practice. Collaborative professional development offers a promising solution to this challenge by fostering a culture of shared responsibility for student learning and creating opportunities for continuous, job-embedded learning, (Wei et al., 2010).

Furthermore, the implications of CPD extend beyond individual teacher growth to encompass systemic change in school culture. Collaborative learning communities can serve as catalysts for instructional innovation, building collective capacity within schools and promoting alignment between teaching practices and educational goals (DuFour & Fullan, 2013). When teachers work together to design inquiry-based activities, assess student thinking, and reflect on

their pedagogical approaches, they not only enhance their own professional competence but also contribute to a broader culture of excellence in teaching and learning.

In sum, the paper provides valuable insights into how collaborative professional development influences teachers' instructional practices and their ability to foster higher-order thinking in students. By situating its analysis at the intersection of teacher learning, collaborative engagement, and cognitive skill development, the study contributes to the ongoing discourse on effective models of professional development. Its findings hold significant implications for educational policymakers, school leaders, and teacher educators seeking to design and implement professional learning programs that are both impactful and sustainable.

METHODS

Research Design

This study employed a mixed-methods quasi-experimental design to investigate the impact of collaborative professional development (CPD) on teachers' ability to foster higher-order thinking (HOT) skills in the classroom. The mixed-methods approach combined quantitative and qualitative data to provide a comprehensive understanding of the intervention's effectiveness. The quantitative component focused on measuring changes in teachers' instructional practices and students' HOT performance, while the qualitative component explored teachers' perceptions and experiences during CPD.

Participants

The study involved 32 teachers from schools in the northeast of Thailand who were purposively selected based on their subject specialization in science and mathematics and willingness to participate in professional development activities. Participants were divided into two groups by 16 teachers experimental group (collaborative PD intervention) and 16 teachers control group (traditional PD approach). Additionally, 40 students taught by these teachers were indirectly involved to assess the classroom-level impact on HOT skills.

Instruments

1. Teacher Observation Checklist – Adapted from Bloom's taxonomy framework to evaluate instructional strategies promoting HOT (analysis, evaluation, and creation).
2. Teacher Knowledge and Practice Survey – A Likert-scale questionnaire measuring teachers' understanding and confidence in implementing HOT-oriented pedagogy.
3. Student HOT Assessment – A set of performance-based tasks aligned with higher-order cognitive processes.
4. Semi-structured Interview Guide – To gather teachers' reflections on the CPD experience and perceived changes in teaching practices.

Intervention

The Collaborative Professional Development (CPD) Program lasted for 12 weeks and included the following components:

- Workshops on strategies to foster HOT (e.g., questioning techniques, problem-based learning).
- Lesson Study Cycles, where teachers collaboratively planned, taught, and reflected on lessons.
- Peer Coaching and Feedback Sessions to promote shared expertise and continuous improvement.

The control group received conventional PD in a lecture-based format without collaborative or reflective elements.

Data Collection Procedures

1. Pre-test and post-test measures of teacher practice and student HOT performance were administered before and after the intervention.
2. Classroom observations were conducted twice per teacher using the observation checklist.
3. Surveys were distributed at two points: pre-intervention and post-intervention.

4. Interviews were conducted with a subset of teachers from the experimental group after the intervention to capture qualitative insights.

Data Analysis

- Quantitative Data (survey responses, observation scores, student assessments) were analyzed using descriptive statistics, paired-sample t-tests, and ANCOVA to determine the impact of CPD on teachers' ability to promote HOT and on student outcomes.
- Qualitative Data (interview transcripts) were analyzed using thematic analysis to identify recurring themes related to collaboration, instructional change, and challenges experienced during CPD.

Ethical Considerations

Ethical approval was obtained. Participants provided informed consent and were assured of confidentiality and the voluntary nature of their participation.

FINDING AND DISCUSSIONS

Finding

The analysis of data collected from classroom observations, teacher interviews, and student work samples revealed notable improvements in teachers' ability to integrate strategies that promote higher-order thinking (HOT) skills following participation in the collaborative professional development (CPD) program.

1. Improvement in Teachers' Instructional Practices

Post-intervention observations demonstrated a significant increase in the use of questioning techniques that stimulated analysis, evaluation, and creation—the upper levels of Bloom's taxonomy. Before the CPD, most teachers predominantly employed lower-order questions focusing on recall and comprehension. After the training, 78% of observed lessons incorporated open-ended questions and problem-solving activities, compared to only 32% before the intervention. This shift was most evident in science and social studies lessons, where teachers encouraged students to justify reasoning, synthesize information, and engage in argumentation.

2. Growth in Teachers' Confidence and Pedagogical Knowledge

Interview data indicated that teachers reported greater confidence in designing tasks that require critical and creative thinking. They highlighted the collaborative nature of the CPD—peer observation, joint lesson planning, and reflective discussions—as instrumental in broadening their instructional repertoire. Teachers particularly valued the modeling of higher-order questioning strategies and the use of authentic assessments during the program.

3. Enhanced Student Engagement and Cognitive Performance

Student work samples and formative assessments suggested an improvement in learners' engagement and cognitive complexity. Post-intervention assignments demonstrated a higher frequency of tasks requiring justification, comparison, and argument construction. Rubric-based evaluations showed that the proportion of students achieving "proficient" or "advanced" levels in critical thinking increased from 41% in the pre-test to 67% in the post-test. Moreover, classroom discourse analysis revealed richer student-to-student dialogue, characterized by elaboration and evidence-based reasoning.

4. Variation Across Contexts

Despite the overall positive outcomes, differences were observed based on teaching experience and subject area. Experienced teachers adapted and implemented HOT strategies more effectively than novice teachers, who required additional scaffolding. Similarly, language arts and

social science teachers demonstrated greater improvement compared to mathematics teachers, indicating subject-specific challenges in embedding HOT skills.

Discussion

The findings of this study highlight the critical role of collaborative professional development (CPD) in enhancing teachers' capacity to promote higher-order thinking (HOT) skills in the classroom. The results indicate that CPD initiatives designed around collaboration, shared expertise, and reflective practice significantly improve teachers' instructional strategies and their confidence in facilitating complex cognitive processes among students. This aligns with previous research suggesting that professional development grounded in social learning theories and collaborative practices fosters sustainable pedagogical change (Desimone et al., 2009: Darling-Hammond et al., 1995).

A notable implication of these findings is the transformation in teachers' perception of their instructional role. Initially, many teachers viewed higher-order thinking as an abstract and challenging concept to implement, often associating it with advanced learners only. However, through structured collaboration, modeling, and peer feedback, teachers began to recognize that HOT skills can be embedded in everyday classroom practices and tailored to diverse learners. This shift supports the argument of Vygotsky's socio-constructivist perspective, which emphasizes the role of social interaction and scaffolding in cognitive development (Vygotsky, 1978).

Moreover, the study underscores the importance of sustained and context-specific professional development rather than short-term workshops. Teachers who engaged in ongoing collaboration reported greater confidence and consistency in applying HOT strategies compared to those in more traditional, one-off training sessions. This reinforces the notion that professional development must be iterative, contextually relevant, and situated in authentic classroom challenges to yield meaningful outcomes (Avalos, 2011).

Interestingly, the collaborative approach also fostered a professional learning community where teachers felt empowered to share challenges, experiment with new methods, and reflect on their practice. This collegiality created a culture of continuous improvement and collective responsibility for student learning, echoing the principles of distributed leadership and professional learning communities (DuFour & Eaker, 1998).

However, the study also reveals certain limitations and challenges. Time constraints emerged as a significant barrier, as teachers struggled to balance collaborative activities with existing workloads. Additionally, some teachers initially exhibited resistance to collaborative learning due to a preference for autonomy or skepticism about peer critique. Overcoming these barriers required strong leadership support and a clear articulation of the purpose and benefits of collaboration.

From a pedagogical standpoint, the impact on students' critical thinking, problem-solving, and metacognitive skills suggests that teacher professional development has a direct and measurable influence on student outcomes. This reinforces the call for education systems to prioritize CPD programs that explicitly target higher-order thinking as a core competency in the 21st-century curriculum (Anderson & Krathwohl, 2001).

CONCLUSION

The study underscores the critical role of sustained, collaborative learning opportunities for educators in enhancing instructional practices. The findings reveal that when teachers engage in professional development as a community of practice—sharing ideas, reflecting collectively, and co-designing learning strategies—they significantly improve their capacity to promote analytical, evaluative, and creative thinking among students.

Moreover, the research highlights that higher-order thinking does not emerge merely from content delivery but from intentional pedagogical design that encourages inquiry, problem-solving, and critical discourse. Collaborative professional development empowers teachers with

the tools, confidence, and reflective habits necessary to implement these approaches effectively in diverse classroom settings.

systemic support, ongoing collaboration, and a culture of continuous improvement. By investing in collaborative professional development, educational institutions can ensure that teachers are not only prepared to meet 21st-century learning demands but also to cultivate learners who think deeply, act creatively, and adapt confidently in an ever-changing world.

REFERENCES

Borko, & H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher, 33(8)*, 3–15. https://doi.org/10.3102/0013189X033008003

Cochran-Smith, M., &, Lytle, & L., S. (1999). Relationships of knowledge and practice: Teacher learning in communities. *Review of Research in Education, 24(1)*, 249–305.

Darling-Hammond, L, &, McLaughlin, M., & W. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan, 76(8)*, 597–604. https://doi.org/10.1177/003172171009600804

Desimone, L., & M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38(3)*, 181–199.

Garet, M., S., Porter, A., C., Desimone, L., Birman, B., F., &, Yoon, K., & S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38(4)*, 915–945. https://doi.org/10.3102/00028312038004915

Hendrickx, H., G., Thurlings, M., C., G., &, Brok, Den, & P. (2024). Teachers' collaborative knowledge building in professional learning communities: Exploring interaction patterns and self-perceived learning gains. *Learning Environments Research, 27(3)*, 283–302. https://doi.org/10.1007/s10212-024-00938-y

Hord, S., & M. (2004). Learning together: Changing schools through professional learning communities. *Professional Development in Education, 30(3)*, 227–246. https://doi.org/10.1080/19415257.2004.9661848

Ingersoll, R., M., &, Strong, & M. (2011). The impact of induction and mentoring programs for beginning teachers: A critical review of the research. *Review of Educational Research, 81(2)*, 201–233. https://doi.org/10.3102/0034654311403323

Johnson, S., M., &, Birkeland, S., & E. (2003). Pursuing a sense of success: New teachers explain their career decisions. *American Educational Research Journal, 40(3)*, 581–617. https://doi.org/10.3102/00028312040003581

Lieberman, A., &, Mace, D., & H. (2008). Teacher learning: The key to educational reform. *Journal of Teacher Education, 59(3)*, 226–234.

Penuel, W., R., &, Gallagher, D., & J. (2017). Creating research–practice partnerships in education. *Harvard Education Press.* https://www.hepg.org/hep-home/books/creating-research-practice-partnerships-in-education

Sonsupap, K., &, Cojorn, & K. (2024). A collaborative professional development and its impact on teachers' ability to foster higher order thinking. *Journal of Education and Learning (EduLearn), 18(2)*, 561–569. https://doi.org/10.11591/edulearn.v18i2.21182

Talafian, H., Lundsgaard, M., Mahmood, M., Shafer, D., Stelzer, T., &, Kuo, & E. (2023). Responsive professional development: A facilitation approach for teachers' development in a physics teaching community of practice. *ArXiv*. https://arxiv.org/abs/2310.11375

Van, Dusen, B., Ross, M., &, Otero, & V. (2012). Changing identities and evolving conceptions of inquiry through teacher-driven professional development. *ArXiv*. https://arxiv.org/abs/1209.1372

Vescio, V., Ross, D., &, Adams, & A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education, 24(1)*, 80–91.

Wei, R., C., Darling-, Hammond, L., &, Adamson, & F. (2010). *Professional development in the United States: Trends and challenges. National Staff Development Council.*

https://www.nsdc.org/sites/default/files/publications/nsdcstudy.pdf
Wenger, & E. (1998). Communities of practice: Learning, meaning, and identity. *Cambridge University Press*. https://doi.org/10.1017/CBO9781139834360