

Original Article

## **Dialogic Communication, Critical Thinking and Collaborative Problem-Solving of Public Elementary School Teachers**

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### **Abstract**

Dialogic communication and critical thinking influence how teachers manage classroom demands, yet their link to collaborative problem-solving (CPS) lacks local empirical evidence. This study investigated these relationships among 131 public elementary teachers in Paquibato District, Davao City, using a quantitative correlational design. Survey data measured dialogic communication (speaking, disclosing, testing, probing), critical thinking (understanding, interpretation, analysis, inference, evaluation), and CPS (social, emotional, behavioral challenges). Results showed moderate dialogic communication but high level of critical thinking and very high level of CPS. Significant positive correlations were found between both independent variables and CPS. Multiple regression indicated that social challenges contributed most significantly to CPS scores. These findings support professional development focused on strengthening teacher dialogue and reasoning to improve collective problem resolution.

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### **1. Introduction**

Collaborative problem solving has moved from a student skill to a practical demand for teachers. Teachers work in tight schedules, navigate competing priorities, and face rapid curriculum shifts. When a lesson fails, a learner struggles, or a school directive changes, solutions often require a team response. In these situations, a teacher's capacity to reason well and communicate with colleagues can determine whether the group reaches a shared plan or stays stuck in parallel work.

Dialogic communication provides the social infrastructure for this team work. Dialogic approaches stress open exchange, uptake of others' ideas, and shared construction of meaning. Studies on dialogic classroom discourse show that shifts in dialogic practice align with gains in engagement and cognitive activation, which signals that dialogue can change the quality of thinking in interaction (Böheim et al., 2021). When teachers adopt similar dialogic moves with peers, they can surface assumptions, test claims, and co-design responses instead of trading quick opinions.

Evidence also shows that dialogic teaching interventions can produce measurable changes, though effects depend on sustained support and clear routines. A systematic review of dialogue-based teaching interventions in Chinese classrooms reported that structured dialogue programs can improve learning related outcomes and classroom participation, but implementation quality remains decisive (Zheng & Shi, 2025). This point matters for teacher teams. Even when collaboration time exists, the talk can stay procedural unless participants share norms for questioning, justification, and respectful challenge.

Critical thinking adds the cognitive layer that helps dialogue stay productive. Critical thinking includes interpretation, analysis, inference, and evaluation that guide what people accept as evidence and how they decide among options. A review on critical thinking in teacher education argued that the field still needs clearer models of how teacher preparation and workplace learning build critical thinking for practice (Yuan, 2023). Within school systems, teacher autonomy and collaboration relate to how often teachers use critical thinking focused instruction, which implies that collective work can shape thinking routines, not only individual habits (Guo & Wang, 2021).

Dialogue and critical thinking also connect in empirical classroom research. Work on dialogic instructional programs found that specific teacher talk moves can draw out higher levels of critical thinking, which suggests that talk structures can cue reasoning processes (Cui & Teo, 2023). For teacher teams, the same principle applies. When members ask for evidence, invite alternatives, and press for clarity, they raise the chance that the group will converge on a plan with stronger logic and better fit to context.

Teacher collaboration literature further supports the value of communication and shared inquiry. A systematic review of teacher collaboration found consistent links to professional learning and instructional improvement, while also warning that weak structures can lead to shallow cooperation (Vangrieken et al., 2015). More recent work on professional learning communities continues to show positive associations between collaborative structures and teacher outcomes, though effects vary by the specific dimension of collaboration (Mydin et al., 2024). These studies suggest that collaboration alone is not a guarantee of effective collective problem solving.

Collaborative problem solving itself has distinct behavioral signatures. Research that tracks roles and interaction patterns in collaborative problem solving tasks shows that teams develop emergent roles that shape coordination and outcomes, which signals that social processes can carry as much weight as technical knowledge

(Mao et al., 2024). Meta-analytic evidence also suggests that collaborative problem-solving interventions can strengthen critical thinking outcomes, which supports the claim that collaboration and thinking can reinforce each other (Xu et al., 2023).

Despite these insights, local evidence on how dialogic communication and critical thinking relate to collaborative problem solving among public elementary teachers remains thin. Many studies focus on students, higher education settings, or single subject classrooms. Public elementary schools present different constraints such as large class sizes, limited preparation time, and multi-grade responsibilities. The present study addressed this gap by describing the level of dialogic communication, critical thinking, and collaborative problem solving among teachers in one district and by testing their statistical relationships. The study also examined the contribution of collaborative problem-solving domains to the overall collaborative problem-solving score through regression analysis.

## **2. Methodology**

The study used a quantitative correlational design to describe key variables and test their relationships. Participants were 131 public elementary school teachers from Paquibato District, Division of Davao City. The study used a survey questionnaire with three sections. The first section measured dialogic communication through four facets: speaking, disclosing, testing, and probing. The second section measured critical thinking through five facets: understanding, interpretation, analysis, inference, and evaluation. The third section measured collaborative problem-solving through three facets: social challenges, emotional challenges, and behavioral challenges. Items used a Likert-type response format and produced subscale and overall mean scores. The instrument set showed acceptable internal consistency based on pilot reliability evidence (Cronbach alpha = .781). After ethics clearance and site permissions, the researcher administered the survey to teachers and collected completed forms. Data analysis used descriptive statistics to summarize the level of each construct, Pearson product moment correlation to test relationships between dialogic communication and collaborative problem solving and between critical thinking and collaborative problem solving, and multiple regression to estimate the contribution of the collaborative problem-solving domains to the overall collaborative problem-solving score. All tests used an alpha level of .05.

## **3. Results**

Table 1 presents descriptive results for dialogic communication. Dialogic communication showed an overall mean of 3.39, which falls within the moderate range. Testing had the highest mean at 3.47, while speaking had the lowest mean at 3.29.

**Table 1.** Summary of dialogic communication (n = 131).

Domain	Mean	Descriptive level
Speaking	3.29	Moderate
Disclosing	3.40	Moderate
Testing	3.47	High
Probing	3.40	Moderate
Overall	3.39	Moderate

Critical thinking showed an overall mean of 3.48, which indicates a high level (Table 2). Analysis produced the highest mean at 3.65, while inference produced the lowest mean at 3.31.

**Table 2.** Summary of critical thinking (n = 131).

Domain	Mean	Descriptive level
Understanding	3.46	High
Interpretation	3.35	Moderate
Analysis	3.65	Very high
Inference	3.31	Moderate
Evaluation	3.46	High
Overall	3.48	High

Collaborative problem-solving showed an overall mean of 3.51, which indicates a very high level (Table 3). Behavioral challenges had the highest mean at 3.63, while social challenges had the lowest mean at 3.35.

**Table 3.** Summary of collaborative problem-solving (n = 131).

Domain	Mean	Descriptive level
Social challenges	3.35	High
Emotional challenges	3.55	Very high
Behavioral challenges	3.63	Very high
Overall	3.51	Very high

Table 4 presents correlation results between the study variables. Correlation analysis showed statistically significant positive associations between dialogic communication and collaborative problem solving and between critical thinking and collaborative problem solving. Both relationships had an estimated correlation of about .30 and met the significance criterion at  $p < .001$ .

**Table 4.** Correlation results.

Variables	r	p-value
Dialogic communication and collaborative problem-solving	0.30	< .001
Critical thinking and collaborative problem-solving	0.30	< .001

Regression analysis showed that social challenges, emotional challenges, and behavioral challenges were significant contributors to the overall collaborative problem-solving score (Table 5). The model explained 40 percent of the variance in overall collaborative problem solving ( $R^2 = 0.40$ ) and the omnibus test was statistically significant ( $F = 565.54$ ,  $p < .001$ ). Social challenges had the largest unstandardized coefficient ( $B = 2.02$ ).

**Table 5.** Regression results predicting overall collaborative problem-solving.

<b>Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t-stat</b>	<b>p-value</b>
Social challenges	2.02	0.05	28.12	< .001
Emotional challenges	0.33	0.03	9.41	< .001
Behavioral challenges	0.13	0.06	9.39	< .001
Model summary	$R^2 = 0.40$	$F = 565.54$		$p < .001$

#### **4. Discussion**

The descriptive results point to a teacher group that reports strong cognitive capacity and strong collaborative problem-solving, alongside only moderate dialogic communication. This pattern suggests that teachers may hold the thinking skills and the willingness to solve problems together, yet their everyday talk routines may not always support deep collective inquiry. Teacher collaboration research often shows this split. Collaboration can exist as meetings and shared tasks, but the interaction quality can remain uneven unless schools cultivate shared norms for dialogue and joint analysis (Vangrieken et al., 2015).

Moderate dialogic communication, paired with high critical thinking, may reflect a context where teachers can reason well in private or in small trusted circles but do not always externalize reasoning in group talk. Dialogue requires more than courtesy and turn taking. It relies on moves that invite alternatives, ask for justification, and create safe space for respectful challenge. Evidence from classroom discourse research shows that targeted shifts in dialogic practice can raise student activation and engagement (Böheim et al., 2021). This supports the idea that dialogic norms can change the cognitive work that occurs within interaction, which can also apply to teacher teams.

The significant positive links between dialogic communication and collaborative problem solving align with theory that views problem solving as a social process with language as a central tool. When teachers disclose constraints, test assumptions, and probe for clarification, they reduce hidden disagreement and increase shared understanding. In collaborative tasks, emergent roles and coordination patterns can shape outcomes, which highlights why communication quality matters even when participants have strong content knowledge (Mao et al., 2024). Teacher teams face

similar coordination demands when they plan lessons, interpret assessment evidence, or respond to learner needs.

The positive link between critical thinking and collaborative problem solving also fits existing evidence. Collaborative problem solving often requires analysis of a situation, evaluation of options, and selection of an action path under uncertainty. A meta-analysis reported that collaborative problem-solving interventions can improve critical thinking outcomes, which suggests that the two capacities can reinforce each other over time (Xu et al., 2023). In school contexts, teachers who apply stronger critical thinking may contribute higher quality explanations, anticipate side effects of a plan, and support a culture where evidence guides decisions.

The literature on critical thinking in teacher development highlights the need to treat critical thinking as a professional practice, not as a generic skill. A review on critical thinking in teacher education argued that programs often promote critical thinking in broad terms while offering limited guidance on how teachers enact it in real instructional decisions (Yuan, 2023). More recent work on teachers' beliefs about critical thinking instruction shows that beliefs can evolve with experience and support, which points to the value of sustained learning structures rather than one off training (Leibovitch et al., 2025). Professional learning communities offer one route for that sustained work when they emphasize shared inquiry and reflective critique.

The regression results highlight the central role of the social dimension of collaborative problem solving. Even in technical work such as lesson planning, teachers must manage relationships, coordinate responsibilities, and negotiate priorities. Research on professional learning communities indicates that collaboration dimensions can show different strengths of association with teacher outcomes, which suggests that social processes within teams can shape what collaboration yields (Mydin et al., 2024). When social coordination is strong, teams can move from polite agreement to collective action with clear roles and accountability.

The discussion also has implications for leadership and professional development. Teacher autonomy and collaboration have been linked to the way teachers use critical thinking focused instruction in cross national evidence, which suggests that school structures can either enable or constrain the enactment of critical thinking in daily work (Guo & Wang, 2021). In practice, leaders can support routines that promote dialogic communication, such as structured protocols for problem identification, evidence sharing, and option appraisal. These routines can protect time for talk that goes beyond updates and instead supports joint reasoning.

Finally, dialogic communication deserves attention as a trainable set of practices. A systematic review of dialogue-based teaching interventions shows that structured programs can shift interaction patterns, but sustained coaching and clear expectations matter (Zheng & Shi, 2025). For teacher teams, a similar approach can include guided rehearsal of talk moves, use of common language for evidence and uncertainty, and norms that treat disagreement as a path to accuracy rather than a threat to collegiality. Such steps can help teachers translate high individual thinking capacity into consistent group problem resolution.

The study has some limitations that shape interpretation. The design was cross-sectional and relied on self-report, which can inflate associations due to shared method variance. The sample came from one district, so generalization should be cautious. Future work can add observational measures of meeting talk, collect performance-based indicators of problem solving, and test models that treat dialogic communication and critical thinking as joint predictors of collaborative outcomes across diverse school contexts.

## **5. Conclusion**

Public elementary school teachers in the study reported moderate dialogic communication, high level of critical thinking and very high level of collaborative problem-solving. Dialogic communication and critical thinking showed significant positive relationships with collaborative problem-solving. Within collaborative problem-solving, the social dimension showed the strongest contribution to the overall score. School based professional development can prioritize dialogic talk routines and evidence-based reasoning within teacher teams to strengthen collective responses to complex instructional problems.

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## **Conflict of Interest Statement**

The authors declare no conflict of interest.

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