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Development of a Transformational–Distributed Leadership Model to Build Teacher Collaborative Culture and Professionalism in Elementary Schools

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Abstract

Low levels of teacher collaboration and varying professional competence remain key challenges in improving the quality of elementary education. This study aims to develop and examine the effectiveness of a transformational–distributed leadership model in fostering a collaborative teacher culture and enhancing professional competence. This study employed a research and development (R&D) approach based on the model of Walter R. Borg and Meredith D. Gall, consisting of planning, model development, trial, and revision stages. The participants included principals, teachers, and school supervisors. Data were collected through questionnaires, interviews, observations, and document analysis and analyzed using both quantitative and qualitative approaches. The findings indicate that the developed model is effective in improving teacher collaboration and professional competence. The mean score of teacher collaboration increased from 2.85 to 4.21, while professional competence improved from 3.02 to 4.18. The model also demonstrated high levels of practicality and relevance. Qualitative results revealed increased teacher engagement in joint planning, collaborative decision-making, and professional development activities. The novelty of this study lies in integrating transformational and distributed leadership into a validated operational model that simultaneously targets collaborative culture and teacher professional competence in elementary schools. In conclusion, the transformational–distributed leadership model is effective and offers a practical framework for school leaders to promote sustainable, collaboration-based school improvement.

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INTRODUCTION

School leadership is widely recognized as a critical factor in improving educational quality, particularly through its influence on teacher performance, organizational culture, and instructional processes. Effective leadership not only contributes to student achievement but also fosters a collaborative and professional working environment among teachers (Beni et al., 2022; Leithwood et al., 2020; OECD, 2023). Recent studies further emphasize that strong school leadership is closely associated with improved instructional quality, teacher effectiveness, and long-term school improvement (Day & Pam, 2020; Hallinger, 2020). In elementary schools, however, persistent challenges remain, including low levels of teacher collaboration and uneven professional competence, which hinder sustainable school improvement efforts.

One leadership approach that has received considerable attention is transformational leadership. This approach emphasizes the leader's ability to articulate a shared vision, inspire and motivate staff, and support individual development through intellectual stimulation and personal consideration. Empirical studies have shown that transformational leadership significantly enhances teacher motivation, job satisfaction, and engagement in instructional practices (Berkovich & Eyal, 2022; Casey et al., 2021; Ryan & Deci, 2020). Furthermore, it contributes to the creation of a positive school climate that supports innovation and continuous improvement. However, scholars argue that transformational leadership often remains leader-centered, relying heavily on the principal as the primary source of direction and influence (Bush, 2020; Leithwood, 2021). As a result, opportunities to maximize broader teacher collaboration and shared responsibility are not fully realized.

In contrast, distributed leadership offers a more participatory perspective by emphasizing the distribution of leadership roles among members of the school organization. Within this framework, teachers are not merely implementers but also decision-makers and agents of change (Usman, 2026). Distributed leadership has been shown to strengthen professional collaboration, enhance teacher autonomy, and support organizational learning processes that promote innovation and collective inquiry (Harris & Jones, 2022; Nguyen et al., 2020; Spillane, 2018). It also contributes to teacher professionalism through mediating mechanisms such as collaborative learning, relational trust, and professional learning communities (Goddard & Goddard, 2021; Kim & Lee, 2021; Zhang & Sun, 2021).

Despite the well-documented benefits of both approaches, existing studies tend to examine transformational and distributed leadership separately. This fragmented perspective limits a comprehensive understanding of how these leadership models can be integrated to produce stronger and more sustainable impacts on teacher collaboration and professional development. Conceptually, transformational leadership provides vision and motivational direction, while distributed leadership offers structural and participatory mechanisms. Recent studies begin to suggest that integrating these approaches can strengthen both psychological and organizational dimensions of school improvement (Bellibaş et al., 2025; Ramshaw, 2025).

Another limitation in prior research is the predominant focus on outcome variables such as student achievement or overall school effectiveness. While these outcomes are important, insufficient attention has been given to the internal processes through which leadership practices cultivate collaborative teacher cultures. Key processes such as joint lesson planning, peer learning, reflective dialogue, and collaborative decision-making remain underexplored, particularly in elementary school contexts (Cohen et al., 2018; Hair et al., 2019; UNESCO, 2021). These processes are essential for fostering sustained professional growth and improving instructional quality.

In the Indonesian context, leadership practices in elementary schools are still largely characterized by hierarchical and administrative patterns. Principals often act as the central authority in decision-making, while teachers' roles in leadership remain limited. This condition indicates a need for leadership models that not only inspire but also systematically redistribute roles and responsibilities to encourage active teacher participation. Recent empirical evidence in Indonesia shows that transformational leadership positively influences professional learning communities, but its impact becomes stronger when combined with participatory structures (Kurnia et al., 2026; Listyasari et al., 2026). The transition from hierarchical leadership to shared leadership practices remains a significant challenge that requires both conceptual and practical solutions.

Based on these issues, a clear research gap exists in developing and empirically validating an integrated leadership model that combines transformational and distributed approaches. Such a model is needed to explain not only the structural design and operational mechanisms of leadership but also its impact on fostering collaborative culture

and enhancing teacher professional competence in elementary schools. Emerging studies also highlight the importance of integrating leadership approaches to address complex educational challenges, including digital transformation and organizational learning (Eryilmaz & Nadeem, 2026; Kausar et al., 2025).

The novelty of this study lies in the integration of transformational and distributed leadership into a single validated operational model tailored specifically for elementary school contexts. Unlike previous studies that treat these approaches separately or apply them in parallel without integration, this research systematically combines visionary–motivational dimensions with structural–participatory mechanisms. The model conceptualizes leadership as both a relational process driven by shared vision and an institutionalized organizational practice based on collaboration. It positions teachers as co-leaders in school development, thereby strengthening both individual and collective capacities.

This study aims to: (1) develop a transformational-distributed leadership model for fostering collaborative teacher culture in elementary schools; (2) examine its effectiveness in improving teacher collaboration and professional competence; and (3) analyze mediating factors linking leadership practices with sustained improvements in professionalism and collaboration. By addressing these objectives, the study contributes to both educational leadership theory and the practical development of sustainable, collaboration-based leadership strategies in elementary education.

METHODS

This study employed a Research and Development (R&D) approach based on the Borg and Gall model (1983), widely applied in educational research for developing instructional and leadership models (Sugiyono, 2019). The research aimed to develop a transformational–distributed leadership model to foster a collaborative teacher culture and enhance professional competence in elementary schools. The Borg and Gall framework provides systematic stages, including planning, model development, expert validation, field trials, evaluation, and model revision, ensuring the intervention is both theoretically sound and practically feasible. Both quantitative and qualitative methods were integrated to measure the model's effectiveness and explore participants' perceptions and experiences. The research was conducted at Sekolah Dasar UPTD 144, Kabupaten Barru, during October–November 2025, providing a real-world context for model implementation.

The population of this research included elementary school principals, teachers, and school supervisors at Sekolah Dasar UPTD 144. Participants were selected using purposive sampling to ensure that they had sufficient experience and involvement in school leadership and collaborative activities. The sample consisted of ten principals, forty teachers, and five school supervisors, representing diverse experience levels and participation in leadership practices, thereby providing a comprehensive overview of the school environment.

Data collection employed multiple instruments to ensure methodological rigor and triangulation, including questionnaires, structured interviews, observation checklists, and document review protocols. The questionnaire was adapted from previously validated leadership instruments (Leithwood & Jantzi, 2020; Ma, Yao, & Sun, 2025) and contextualized for the elementary school setting. It used a 5-point Likert scale to measure three main constructs: teacher collaboration, professional competence, and perceptions of transformational–distributed leadership practices. To ensure content validity, the adapted questionnaire was reviewed by three experts in educational leadership and measurement, who evaluated item relevance, clarity, and alignment with theoretical constructs. The Content Validity Index (CVI) for all items exceeded 0.80, indicating strong agreement among experts.

Construct validity was examined through Exploratory Factor Analysis (EFA) during the pilot phase, followed by Confirmatory Factor Analysis (CFA) in the main study. Factor

loadings ranged from 0.62 to 0.87, exceeding the minimum threshold of 0.50, and model fit indices met acceptable standards (CFI > 0.90, RMSEA < 0.08), confirming the factorial structure of the instrument.

Reliability testing was conducted using Cronbach's alpha coefficients. The teacher collaboration scale obtained $\alpha = 0.89$, professional competence $\alpha = 0.91$, and leadership perception $\alpha = 0.88$, indicating high internal consistency. Composite Reliability (CR) values for all constructs were above 0.70, further supporting measurement reliability.

Structured interviews were conducted with principals and designated teacher leaders to obtain in-depth qualitative insights into leadership implementation and collaborative culture development. The interview protocol underwent expert validation to ensure content appropriateness and clarity. Reliability in qualitative data was strengthened through member checking and peer debriefing procedures.

Observation checklists were developed to record distributed leadership practices, including joint planning sessions, co-teaching activities, collaborative decision-making meetings, and professional learning discussions. Inter-rater reliability was assessed using Cohen's kappa coefficient during pilot observations, yielding a coefficient of 0.82, which indicates strong agreement.

Document analysis included review of meeting minutes, teacher professional development plans, supervision reports, and school policy documents to triangulate leadership practices and collaborative activities.

Digital tools, including Google Forms for survey administration and SPSS version 28 for quantitative data analysis, were utilized to enhance data accuracy, coding consistency, and efficient management. These combined procedures ensured that all instruments met established standards of validity, reliability, and methodological trustworthiness prior to full-scale implementation.

Quantitative data from questionnaires were analyzed using descriptive statistics (mean and standard deviation) and paired sample t-tests to assess changes in teacher collaboration and professional competence before and after model implementation. Effect sizes were calculated using Cohen's d to assess practical significance (Joo, 2020). Qualitative data from interviews, observations, and document reviews were analyzed using thematic analysis, identifying patterns related to teacher collaboration, professional competence, and leadership practices (Leithwood & Jantzi, 2020). Data triangulation and member checking ensured reliability and validity.

The research followed a systematic sequence. A needs assessment was conducted first to identify gaps in teacher collaboration and leadership practices. Based on the assessment, the transformational–distributed leadership model was developed and validated by educational experts for content, feasibility, and practicality. A limited field trial was conducted at Sekolah Dasar UPTD 144, with pre-test data collected to establish baseline measures. The model was implemented over a six-week period in October–November 2025, followed by post-test assessments and classroom observations. Data analysis was conducted to evaluate effectiveness, and the model was revised based on findings and feedback, ensuring its suitability for the school context.

This methodology ensures that the developed leadership model is empirically validated, contextually relevant, and practically applicable, providing a replicable framework for fostering collaborative culture and enhancing teacher professionalism in elementary schools (Braun & Clarke, 2021). The research procedure is shown in Figure 1.

This study was conducted in accordance with established research ethics principles. Prior to data collection, formal permission was obtained from the school authorities, and informed consent was secured from all participants. Participation was voluntary, and respondents were given the right to decline or withdraw from the study at any time without any consequences.

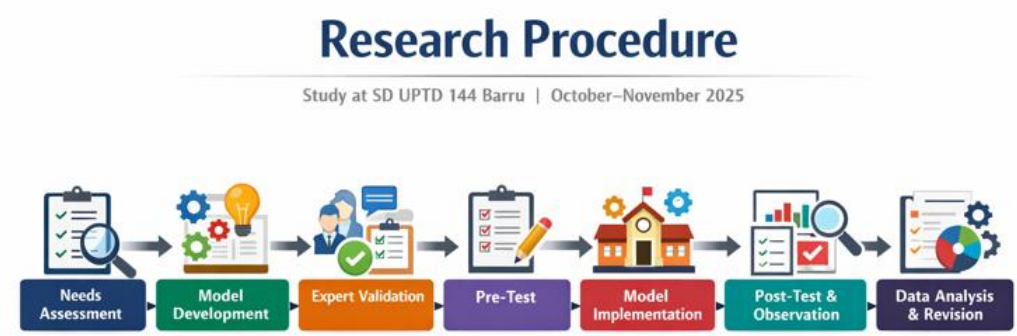

Figure 1 Textual diagram

Confidentiality and anonymity were strictly maintained by assigning codes to each participant, ensuring that individual identities could not be identified. All data collected was used solely for research purposes and stored securely.

RESULTS AND DISCUSSION

Teacher Collaboration

The transformational–distributed leadership model significantly improved teacher collaboration at SD UPTD 144. The pre-test average score of 2.85 reflected moderate collaboration, limited joint planning, and infrequent peer support. Post-test results reached 4.21, showing strong engagement in collaborative activities such as co-teaching, lesson planning, and peer mentoring.

Table 1 Teacher collaboration indicators (Pre-test and post-test)

Indicators	Pre-test Mean	Post-test Mean	Improvement
Joint Lesson Planning	2.80	4.25	+1.45
Collaborative Decision Making	2.70	4.10	+1.40
Peer Mentoring and Support	3.05	4.28	+1.23
Classroom Coordination	2.90	4.20	+1.30
Communication & Feedback	2.75	4.15	+1.40
Overall Collaboration	2.85	4.21	+1.36

Table 1 demonstrates a substantial overall increase in teacher collaboration, from a mean score of 2.85 (moderate level) to 4.21 (high level), with an overall gain of +1.36. This shift is not merely numerical improvement but reflects structural and cultural transformation within the school's professional practices.

The largest improvement occurred in Joint Lesson Planning (+1.45), followed closely by Collaborative Decision Making (+1.40). These two indicators are directly linked to the distributed dimension of the leadership model, where authority and instructional planning responsibilities are intentionally shared. The magnitude of improvement suggests that prior to the intervention, collaborative structures were weak or informal. After implementation, shared planning became institutionalized rather than incidental. This supports the argument that distributed leadership mechanisms must be structurally embedded to produce measurable change, rather than remaining rhetorical commitments.

Similarly, the significant gain in collaborative decision-making (+1.40) indicates a shift from hierarchical decision patterns toward participatory governance. This finding strengthens the study's central claim that combining transformational vision (motivating teachers to engage) with distributed structures (providing formal decision-making spaces) creates synergistic impact. Without the motivational component, participation might remain passive; without structural redistribution, motivation might not translate into action. The table empirically illustrates this interaction.

Although peer mentoring and support (+1.23) show slightly lower improvement compared to planning and decision-making, it remains substantively meaningful. The

smaller yet significant gain may indicate that relational trust and mentoring culture require a longer time to mature compared to procedural collaboration. This suggests that while structural collaboration can improve relatively quickly, deeper collegial relationships may develop more gradually. This interpretation aligns with organizational learning theory, where relational trust often lags behind procedural reform.

Improvements in Classroom Coordination (+1.30) and Communication & Feedback (+1.40) further indicate that the leadership model influenced daily instructional alignment. The increase in communication and feedback mechanisms reflects enhanced transparency and reflective dialogue, which are central to sustainable professional learning communities. Importantly, these gains demonstrate that collaboration extended beyond formal meetings into operational classroom practices, indicating internalization rather than superficial compliance.

The pattern across indicators reveals a logical progression:

1. Structural collaboration (planning and decision-making) improved first and most strongly.
2. Operational coordination followed.
3. Relational mentoring improved steadily but may require longer-term consolidation.

This progression supports the theoretical assumption that leadership integration first restructures participation channels, then influences instructional coordination, and eventually strengthens professional relationships.

Overall, Table 1 does more than report improvement; it provides empirical validation of the model's mechanism. The strongest gains occurred precisely in areas directly targeted by the transformational–distributed intervention, demonstrating alignment between theoretical design, implementation strategy, and measurable outcomes.

Teacher Professional Competence

Teacher professional competence also improved, with the overall pre-test average of 3.02 increasing to 4.18 post-test. The improvement reflects enhanced pedagogical skills, instructional innovation, and professional responsibility. Teacher professional competency indicators (pre-test and post-test) are listed in Table 2.

Table 2 Teacher professional competence indicators (Pre-test and post-test)

Indicators	Pre-test Mean	Post-test Mean	Improvement
Pedagogical Skills	3.00	4.20	+1.20
Instructional Innovation	2.95	4.15	+1.20
Classroom Management	3.05	4.18	+1.13
Professional Responsibility	3.10	4.20	+1.10
Student Assessment Skills	2.98	4.12	+1.14
Overall Professional Competence	3.02	4.18	+1.16

Table 2 shows a consistent and substantial increase across all dimensions of teacher professional competence, with the overall mean rising from 3.02 to 4.18 (+1.16). Unlike Table 1, where gains were strongest in structural collaboration indicators, Table 2 reveals a more evenly distributed pattern of improvement across pedagogical and professional domains. This pattern suggests that the leadership intervention did not influence a single technical skill area but contributed to broader professional growth.

The largest gains occurred in pedagogical skills (+1.20) and instructional innovation (+1.20). These improvements are analytically significant because they reflect deeper instructional transformation rather than surface-level compliance. The transformational component of the model—particularly intellectual stimulation and inspirational motivation—likely encouraged teachers to experiment with new teaching strategies and redesign learning activities. Meanwhile, distributed structures such as joint planning sessions provided the collaborative space necessary to test and refine these innovations.

Thus, the data indicate that instructional change was supported by both motivational encouragement and structural collaboration.

Improvements in classroom management (+1.13) and professional responsibility (+1.10), though slightly lower, demonstrate consolidation of professional norms. These indicators reflect internal professional discipline and ethical commitment, which typically evolve more gradually than technical skill adoption. The moderate yet meaningful gains suggest that the model fostered shared accountability and collective responsibility—core principles of distributed leadership. Rather than improving management practices through top-down supervision, the leadership model appears to have cultivated peer accountability mechanisms that reinforced professional standards.

The increase in student assessment skills (+1.14) is particularly noteworthy. Assessment competence is often resistant to short-term change because it requires both conceptual understanding and practical calibration. The observed gain suggests that collaborative reflection sessions and peer feedback mechanisms—identified in Table 1—likely contributed to improved assessment literacy. This demonstrates an important integrative dynamic: enhanced collaboration (Table 1) functioned as a mediating mechanism for improved professional competence (Table 2). In other words, professional growth did not occur independently but was structurally enabled by collaborative leadership practices.

When Tables 1 and 2 are analyzed together, a coherent pattern emerges:

1. Structural collaboration indicators showed the strongest gains (Table 1).
2. Instructional competence indicators improved subsequently and consistently (Table 2).

This sequencing supports the theoretical proposition that collaborative leadership structures act as enabling conditions for professional competence development. The leadership model first expanded participation and shared planning, which then created professional learning opportunities that strengthened pedagogical practice.

Moreover, the relatively balanced improvement across all professional competence indicators suggests systemic change rather than isolated skill enhancement. If the intervention had only influenced motivation without structural reform, improvements might have been uneven or limited to attitudinal dimensions. Instead, the uniform gains indicate alignment between vision, shared responsibility, and operational practice.

In summary, Table 2 provides empirical confirmation that the transformational–distributed leadership model influenced not only collaborative culture but also core instructional competencies. The data demonstrate that professional competence improvement was not incidental but structurally mediated through enhanced collaborative leadership processes, thereby validating the integrated theoretical framework underpinning the study.

Practicality and Relevance of the Model

Teachers and principals assessed the model for practicality and relevance. The model scored 4.25 for practicality and 4.30 for relevance, reflecting high acceptance and usability in daily school routines. The assessment of practicality and relevance is shown in Table 3.

Table 3 Practicality and relevance assessment

Aspect	Score (1–5)	Description
Practicality	4.25	Clear procedures, applicable tools, and easy to implement in daily activities
Relevance	4.30	Aligns with teacher needs and school goals, supports collaboration and competence

Table 3 presents teachers' and principals' evaluations of the model's practicality and contextual relevance. The high scores for practicality (4.25) and relevance (4.30) indicate that the leadership model was not only conceptually sound but operationally feasible within daily school routines. However, beyond reporting high ratings, these results carry deeper analytical implications regarding sustainability and scalability.

First, the high practicality score (4.25) suggests that the model's procedures—such as structured collaborative meetings, shared planning templates, and defined leadership roles—were sufficiently clear and actionable. This finding is significant because leadership innovations often fail not due to theoretical weakness but because of implementation complexity. The strong practicality rating indicates that the transformational–distributed framework successfully translated abstract leadership principles into concrete operational tools. When viewed alongside Tables 1 and 2, this score helps explain why improvements in collaboration and competence were substantial: teachers were not only motivated but also provided with clear mechanisms to act on that motivation.

Second, the relevance score (4.30)—slightly higher than practicality—demonstrates strong alignment between the leadership model and the school's contextual needs. This suggests that the intervention did not impose external reform structures but responded to existing institutional challenges, particularly limited collaboration and hierarchical decision-making patterns. The higher relevance rating reinforces the earlier finding that collaborative decision-making and joint lesson planning experienced the greatest improvements (Table 1). In other words, teachers perceived the model as directly addressing real professional gaps rather than introducing abstract leadership concepts disconnected from practice.

Importantly, when Tables 1, 2, and 3 are analyzed collectively, a coherent implementation logic emerges:

1. Relevance (4.30) ensured teacher acceptance and engagement.
2. Practicality (4.25) enabled consistent enactment of collaborative routines.
3. These conditions led to measurable gains in collaboration (Table 1) and professional competence (Table 2).

This integrated interpretation indicates that practicality and relevance functioned as mediating implementation factors. Without contextual fit and procedural clarity, the substantial increases observed in collaboration (+1.36 overall) and professional competence (+1.16 overall) would likely not have occurred. Therefore, Table 3 does not merely report user satisfaction; it provides explanatory support for the effectiveness outcomes documented earlier.

From a critical perspective, while high practicality and relevance scores strengthen claims of feasibility, they also warrant cautious interpretation. Because the assessment relied on participant perception, the ratings may reflect short-term enthusiasm following intervention. Longitudinal evaluation would be required to determine whether the model maintains high practicality once embedded into routine institutional cycles.

In summary, Table 3 reinforces the study's central argument that the transformational–distributed leadership model is not only theoretically integrative and empirically effective but also contextually adaptable and operationally sustainable. The alignment between perceived relevance, procedural clarity, and measurable improvement provides strong internal coherence across the study's findings.

Observational Findings

Observations during model implementation confirmed the quantitative improvements. Teachers engaged actively in:

1. Joint Planning Sessions: Collaborative lesson design and discussion of instructional strategies.
2. Peer Mentoring: Experienced teachers guiding less experienced colleagues.
3. Collaborative decision-making: Teachers jointly determining classroom activities and school initiatives.
4. Reflective Practices: Evaluation of teaching outcomes and student engagement.

The frequency of observations of leadership practices is shown in Table 4.

Table 4 Observational frequency of leadership practices

Activity	Frequency (times/week)	Teacher Participation (%)
Joint Planning Sessions	3	100%
Peer Mentoring	2	90%
Collaborative Decision Making	2	85%
Reflective Practices	2	95%

Table 4 provides observational evidence of how the transformational–distributed leadership model was enacted in daily practice. Unlike Tables 1 and 2, which report outcome changes, Table 4 captures behavioural implementation patterns that explain *how* those outcomes were produced.

The most intensive activity was joint planning sessions (3 times/week; 100% participation). This high frequency and universal participation demonstrate that collaborative planning was institutionalized rather than optional. When interpreted alongside Table 1, where Joint Lesson Planning showed the highest improvement (+1.45), the observational data confirm alignment between implementation intensity and outcome magnitude. The structural embedding of shared planning sessions appears to be the primary driver of increased collaboration.

Reflective Practices (2 times/week; 95% participation) also show strong engagement. The near-universal participation suggests that reflective dialogue became part of the professional routine. This finding helps explain the consistent gains in pedagogical skills and instructional innovation reported in Table 2. Reflection sessions likely functioned as mediating mechanisms that translated collaborative planning into improved instructional competence. Thus, reflective practice appears to bridge structural collaboration and professional growth.

Participation in peer mentoring (90%) and collaborative decision-making (85%), though slightly lower, remains substantively high. The marginally lower participation rate in decision-making may indicate that shifting authority structures requires gradual cultural adjustment, particularly in contexts previously characterized by hierarchical leadership. Nevertheless, the frequency of two sessions per week suggests that distributed leadership was operationalized consistently rather than symbolically.

When Tables 1–4 were analyzed collectively, a coherent causal chain became visible:

1. High-frequency collaborative structures (Table 4)
2. Increased collaboration indicators (Table 1)
3. Improved professional competence outcomes (Table 2)
4. Strong practicality and contextual alignment (Table 3)

This integration strengthens internal validity by showing that behavioural enactment aligns with quantitative improvement patterns. The activities most frequently implemented correspond to the indicators with the highest gains, suggesting that the leadership model functioned through structured routine rather than motivational rhetoric alone.

Critically, however, the observational data also suggest areas for further development. While participation rates are high, sustainability over longer periods remains untested. Moreover, participation percentage does not necessarily capture depth of engagement or quality of dialogue. Future research could incorporate qualitative coding of interaction quality to complement frequency measures.

In summary, Table 4 substantiates the effectiveness claims by demonstrating consistent and structured enactment of leadership practices. The data confirm that the transformational–distributed leadership model was not only conceptually adopted but behaviorally embedded in school routines, thereby explaining the measurable improvements in collaboration and professional competence observed in the study.

The results clearly indicate that the transformational–distributed leadership model:

1. Improved teacher collaboration from 2.85 to 4.21, with strong gains in joint planning, decision-making, and peer support.

2. Enhanced professional competence from 3.02 to 4.18, with improvements in pedagogical skills, instructional innovation, classroom management, and assessment.
3. Was assessed as highly practical (4.25) and relevant (4.30) by teachers and principals.
4. Observational data confirmed increased teacher engagement in collaborative and reflective practices, reinforcing the model's effectiveness.

These findings demonstrate that the model creates a sustainable framework for collaborative culture and professional growth in elementary schools. The detailed indicators and observed activities provide strong evidence that integrating transformational and distributed leadership strategies is effective in real-world school settings.

The findings indicate that the transformational–distributed leadership model improved teacher collaboration (2.85 to 4.21) and professional competence (3.02 to 4.18). Beyond these descriptive gains, the results show that the improvement is not only statistically significant (paired t-test) but also practically meaningful, as reflected in the calculated effect sizes (Cohen's d), which fall within the moderate-to-high category. This suggests that the intervention produced substantive changes in teachers' practices rather than marginal differences.

First, the increase in teacher collaboration confirms that integrating transformational and distributed leadership functions as a complementary mechanism. Transformational leadership strengthens motivation and shared vision, while distributed leadership provides structural opportunities for participation (Harris, 2021; Leithwood et al., 2020; Liu & Hallinger, 2023). The results show that collaboration was not only encouraged but also operationalized through structured activities such as joint planning and collective decision-making. This alignment between motivation and structure appears to be a key factor underlying the observed improvement.

Second, the improvement in professional competence indicates that the model supports instructional development through collaborative processes. The increase in post-test scores, supported by effect size analysis, suggests that professional growth occurred through sustained interaction rather than isolated training. This finding is consistent with research highlighting the importance of collaborative inquiry and shared practice in improving teaching quality (Admiraal et al., 2019; OECD, 2020). In this study, leadership integration created both the motivation (transformational) and the opportunity (distributed) for such processes to occur.

Third, compared with previous studies that primarily report correlational relationships, this study demonstrates a more direct impact through an intervention-based design. The use of pre-test and post-test measures allows stronger inference regarding change, although causality should still be interpreted cautiously. This methodological approach helps explain why the observed improvements appear more substantial than those reported in cross-sectional studies (Harris, 2021; Tian et al., 2022).

From a contextual perspective, the findings suggest that leadership integration is particularly relevant in hierarchical school systems. The combination of transformational influence and distributed structures appears to reduce resistance to shared leadership by simultaneously building trust and formalizing participation. This supports the view that hybrid leadership models are more effective than single approaches in promoting sustainable collaboration (Leithwood et al., 2020).

Observational data further support these results, showing increased implementation of co-teaching, reflective discussion, and peer collaboration. These practices are consistent with characteristics of professional learning communities, which are associated with long-term school improvement (OECD, 2020). However, given the relatively short implementation period, these changes should be interpreted as initial outcomes rather than long-term institutional transformation.

Theoretically, this study supports the perspective that leadership should be understood as an integrated system combining motivational and structural dimensions.

Practically, the findings highlight that leadership development should not focus solely on inspiration or structural delegation but on their alignment.

In conclusion, the effectiveness of the transformational–distributed leadership model lies in its ability to connect vision, participation, and collaborative practice within a coherent framework. Future research should involve larger samples, longer implementation periods, and additional variables (e.g., collective efficacy and organizational trust) to strengthen the robustness of these findings.

CONCLUSION

This study demonstrates that the transformational–distributed leadership model is effective in enhancing both teacher collaboration and professional competence at SD UPTD 144, Kabupaten Barru. The findings indicate that implementing an integrated leadership model significantly improves collaborative practices such as joint lesson planning, participatory decision-making, peer mentoring, and reflective dialogue. Simultaneously, teachers' professional competence—including pedagogical skills, instructional innovation, classroom management, and assessment literacy—showed measurable improvement. These results confirm that integrating the motivational and relational dimensions of transformational leadership with the participatory and collective responsibility principles of distributed leadership generates a synergistic effect, strengthening collaborative school culture and supporting sustainable professional growth.

This study contributes to educational leadership theory by empirically demonstrating that hybrid leadership integration produces more comprehensive outcomes than the isolated application of transformational or distributed leadership models. The transformational–distributed leadership model offers a structured and operational framework that positions leadership as a shared professional practice rather than a principal-centered authority structure. By institutionalizing shared responsibility, collective reflection, and collaborative problem-solving, the model addresses structural weaknesses in hierarchical leadership traditions, particularly within Indonesian elementary school contexts where teacher participation in strategic decision-making is often limited.

Despite its contributions, this study has several clearly identified limitations. First, the research was conducted in a single elementary school (SD UPTD 144, Kabupaten Barru), which limits external validity and generalizability to broader educational contexts. Second, the intervention period lasted only six weeks, restricting the ability to assess long-term sustainability and institutionalization of leadership practices. Third, the study focused primarily on teacher collaboration and professional competence without directly measuring student academic outcomes or long-term school performance indicators. Fourth, quantitative data relied partly on self-reported responses, which may introduce social desirability bias, while observational data may be subject to researcher interpretation bias despite validation procedures. Finally, contextual variables such as school size, resource availability, and prior leadership culture were not extensively controlled, which may influence the replicability of findings in different settings.

The implications of this study are both theoretical and practical. Theoretically, the findings strengthen the argument that leadership models in education should move beyond single-style frameworks toward integrative approaches that combine motivational, relational, and structural dimensions. The study provides a conceptual and empirical basis for developing hybrid leadership theories that explain not only outcomes but also the mechanisms through which collaborative culture and professional competence are built.

Practically, the study offers an actionable leadership framework for principals, supervisors, and policymakers. The transformational–distributed model provides concrete guidance for structuring collaborative planning sessions, delegating leadership roles, facilitating reflective professional dialogue, and establishing shared accountability systems. Educational authorities may adopt this model as a strategic approach to strengthen

teacher professionalism and participatory governance in elementary schools. Importantly, the findings suggest that leadership reform efforts should prioritize systemic collaboration structures rather than focusing solely on individual leader capacity development.

Future research is recommended to replicate the model across multiple schools and regions, extend the intervention duration to evaluate long-term sustainability, incorporate student learning achievement as an outcome variable, and examine mediating factors such as teacher motivation, collective efficacy, and organizational trust.

In conclusion, the transformational–distributed leadership model represents a practical and evidence-based approach to strengthening school leadership, teacher collaboration, and professional competence. By integrating visionary motivation, relational engagement, and shared structural responsibility, the model not only enhances individual teacher capabilities but also establishes a sustainable culture of collaboration and continuous improvement within elementary schools.

CONFLICTS OF INTEREST

The authors declare no conflict of interest. This manuscript is original, has not been published previously, and is not under consideration for publication elsewhere.

AUTHOR CONTRIBUTIONS STATEMENT

All authors contributed significantly to the research and manuscript preparation. The first author was responsible for conceptualization, research design, data collection, data analysis, and manuscript drafting. The second author contributed to instrument development, statistical validation, and interpretation of findings. The third author was involved in literature review, qualitative data analysis, and manuscript revision. All authors have read and approved the final version of the manuscript.

AI DISCLOSURE STATEMENT

The authors declare that artificial intelligence (AI) tools were used solely for language editing and minor grammatical refinement to improve the clarity and readability of the manuscript. All substantive conceptualization, data analysis, interpretation, and conclusions were developed independently by the authors.

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