

Collaborative Supervision and Religious Leadership as Predictors of Teacher Innovation in Pesantren-Based Junior High Schools

Banny Haruna ¹, Nurkolis ², Nur Khoiri ³

¹ Universitas PGRI Semarang, Indonesia; bannyharuna80@gmail.com

² Universitas PGRI Semarang, Indonesia; nurkolis@upgris.ac.id

³ Universitas PGRI Semarang, Indonesia; nurkhoiri@upgris.ac.id

Received: 12/06/2026

Revised: 28/08/2026

Accepted: 31/10/2026

Abstract

This study examined the relationships between collaborative supervision, religious leadership, and teacher innovation in pesantren-based junior high schools. A quantitative correlational survey included all 110 teachers in the accessible population of nine schools in Education Coordinating Region III, Brebes Regency. The instruments were piloted with 30 comparable teachers who were not included in the main survey. All items met the validity criterion, and Cronbach's alpha ranged from .959 to .972. Untransformed total scores were used for descriptive analysis, while scores transformed through the Method of Successive Interval were analysed using multiple regression. Collaborative supervision was positively associated with teacher innovation ($B = .592$, $\beta = .446$, $t = 6.023$, $p < .001$). Religious leadership showed a similarly positive association ($B = .425$, $\beta = .444$, $t = 6.000$, $p < .001$). The overall model was significant, $F(2, 107) = 38.082$, $p < .001$, with $R^2 = .416$. Although more than 96% of teachers rated supervision and leadership highly, 18.2% remained in the moderate innovation category. The findings indicate a need for regular, dialogic supervision, fair and caring leadership, and practical support for teachers who still face constraints in developing innovative instruction.

Keywords

Collaborative Supervision; Religious Leadership; Teacher Innovation; Pesantren School; Educational Management

Corresponding Author

Banny Haruna

Universitas PGRI Semarang, Indonesia; bannyharuna80@gmail.com

1. INTRODUCTION

Teacher innovation determines the extent to which changes in curriculum, technology, and assessment are translated into classroom practice. Innovation is not adequately represented by the occasional use of digital devices. It involves identifying a learning problem, finding a relevant idea, trying and adapting it, examining the results, and sharing practices that prove useful. These activities are consistent with the stages of innovation diffusion described by (Rogers, 2003). Gkontelos et al., (2022) likewise treat teachers' innovative work behaviour as a multidimensional process rather than a single act. Innovation therefore depends not only on teachers' willingness but also on a school environment that provides direction, support, and room for responsible experimentation. AlEsa & Durugbo, (2022) show that innovative work behaviour develops through the interaction between individual capacity and organisational conditions. A supportive organisational climate is also associated with innovative behaviour at work (Shanker et al., 2017).

This problem was apparent during preliminary visits to the research sites on 5 and 8 December



© 2026 by the authors. This is an open access publication under the terms and conditions of the Creative Commons Attribution 4.0 International License (CC-BY-SA) license (<https://creativecommons.org/licenses/by-sa/4.0/>).

2025 and in communication with principals and teachers. Teacher-centred instruction was still common, while the use of educational applications, interactive media, and teacher-developed learning materials varied across schools. In several schools, supervision continued to emphasise the completeness of lesson documents more than dialogue about classroom problems and follow-up improvement. Religious role modelling, discipline, and routine religious practice were already prominent, but they were not always connected explicitly to support for instructional experimentation. These preliminary observations were used only to frame the research problem and were not included in the hypothesis testing. They nevertheless indicate that a school may have a strong religious culture without displaying an equally strong level of instructional innovation.

Pesantren-based junior high schools face two sets of demands at the same time. Teachers are responsible for national curriculum outcomes, assessment, and instructional administration while also adapting lessons to religious programmes, boarding routines, institutional rules, and the authority of the pesantren foundation or leader. Romainur et al., (2022) show that general and religious education require deliberate coordination if they are to operate as an integrated programme. Zuhri & Syamsi, (2023) similarly argue that modern curricula can be combined with pesantren traditions without eroding the institution's identity. In practice, tension may arise when a new teaching approach requires timetable changes, digital resources, or unfamiliar patterns of interaction. Innovation in this context must therefore be judged not only by its novelty but also by its instructional value, feasibility, and consistency with the school's values.

Collaborative supervision offers a professional mechanism for helping teachers address these demands. A developmental approach positions principals or supervisors as partners who work with teachers to identify needs, agree on an observation focus, examine classroom evidence, and decide on follow-up action (Glickman et al., 2014). The quality of supervision is therefore determined not simply by the number of classroom visits, but by continuity across planning, observation, dialogue, and follow-up. Joint planning ensures that supervision addresses the teacher's actual problem. Post-observation discussion helps the teacher interpret classroom evidence, while follow-up provides an opportunity to test an improvement and review the result. De Jong et al., (2022) show that teacher collaboration is most useful when it addresses instructional problems and continues over time. Weddle, (2022) further notes that productive collaboration needs to remain connected to evidence and teachers' day-to-day work.

Previous research supports the value of collaborative supervision, although competence and performance have been studied more often than innovation. Purwaningsih et al., (2023) found that teacher participation and supervisory follow-up were associated with better performance. Subagio et al., (2024) emphasised reflection and sustained assistance in curriculum implementation. Suwardi et al., (2020) reported that a collaborative model improved supervision competence, whereas Saman & Hasanah, (2024) treated academic supervision as a means of strengthening professional capacity. Studies by Susanto et al., (2025) and Piandani et al., (2025) also underline the importance of work that continues after classroom observation. More broadly, the meta-analysis by Kraft et al., (2018) shows that specific feedback and continued coaching can improve instruction. Evidence directly linking collaborative supervision to teacher innovation in pesantren-based junior high schools, however, remains limited.

Religious leadership complements professional support through values and working relationships. In this study, it does not refer to a principal's private piety or the frequency of ceremonial activities. It refers to leadership practices that teachers can observe and experience, including moral-spiritual role modelling, integrity, responsibility, fairness in allocating work and opportunities, care, openness to teachers' views, transparent value-based decisions, and concern for the common good. Fry, (2003) explains how vision, hope, and altruistic care can foster meaning and commitment. Oh and Wang (2020) argue that spiritual leadership becomes organisationally relevant when values are evident in relationships and everyday decisions. Samul, (2020) similarly stresses that spiritual leadership must be expressed through consistent workplace practice rather than statements of belief alone.

Religious leadership may be related to innovation because trying a new method involves interpersonal risk. A teacher may face disappointing initial results, need additional resources, or expose limitations in established practice. Chen et al., (2022) found that moral leadership was related to innovative behaviour through leader identification and psychological safety. Javed et al., (2019) reported a comparable mechanism for inclusive leadership. Psychological safety allows organisational members to discuss difficulties and learn from mistakes without fear of humiliation (Frazier et al., 2017). Newman et al., (2017) show that it is important for learning and employee voice. In Islamic education, religious leadership has also been connected to humane and ethical organisational culture (Hidayat et al., 2025). Studies by Maulidin, (2024) and Rachmawati et al., (2023) further highlight the importance of role modelling and consistency between stated values and leadership practice.

Research on teacher innovation has generally examined leadership approaches and individual factors that differ from the model tested here. Zainal & Mohd Matore, (2021) combined teacher self-efficacy with transformational leadership. Bao, (2024) examined meaning at work and uncertainty avoidance in the relationship between transformational leadership and innovative behaviour. Lin, (2022) studied distributed leadership through teacher autonomy and professional collaboration. Messmann et al., (2022) and Cui & Yin, (2023) explained innovative behaviour through the satisfaction of basic psychological needs. Meta-analyses by Hughes et al., (2018) and Lee et al., (2020) confirm that leadership is related to creativity and innovation, but also show that the strength of this relationship depends on context and the mechanisms involved. This literature is valuable, yet it does not examine collaborative supervision and religious leadership together in a pesantren setting.

The contribution of the present study lies in examining two forms of organisational support within one model. Collaborative supervision represents professional development through planning, observation, dialogue, and follow-up. Religious leadership represents leadership quality expressed through role modelling, fairness, care, openness, and value-based decisions. Unlike studies centred on transformational leadership, self-efficacy, or teacher autonomy, this study estimates the contribution of each predictor while controlling for the other. Examining both predictors together is important because a supportive religious climate may not be sufficient when teachers lack structured instructional guidance. Conversely, technically sound supervision may be less effective when teachers do not experience fairness, care, and sufficient safety to discuss their difficulties.

On this basis, the study tested three hypotheses among teachers in nine pesantren-based junior high schools in Education Coordinating Region III, Brebes Regency. The first proposed a positive and significant association between collaborative supervision and teacher innovation. The second proposed a positive and significant association between religious leadership and teacher innovation. The third proposed that collaborative supervision and religious leadership would be jointly associated with teacher innovation. The study also compared the descriptive distributions of the three variables to determine whether high ratings of supervision and leadership were accompanied by comparable levels of teacher innovation. The findings were expected to provide empirical guidance for managing supervision and leadership in ways that respond to the needs of pesantren-based schools.

2. METHODS

This study used a quantitative correlational approach with a survey design. Teachers were the units of analysis. Collaborative supervision (X1) and religious leadership (X2) were measured from teachers' experiences of their principals' practices, whereas teacher innovation (Y) was measured through teachers' self-reported innovative behaviour. The design examined the association of each predictor, as well as their combined association, with teacher innovation at a single measurement point. The study involved no intervention and did not track changes over time. The term predictor therefore refers to a variable's statistical role in the regression model, not to an experimentally established causal relationship.

The research was conducted in nine pesantren-based junior high schools in Ketanggungan, Larangan, and Banjarharjo, all within Education Coordinating Region III of Brebes Regency. The accessible population consisted of 110 teachers employed in these schools when the data were collected. Because every member of the population could be reached, the study used a census of the accessible population and included all 110 teachers. This approach ensured representation of schools with five teachers as well as those with 25 teachers. The findings therefore describe the teachers in the nine participating schools. Including the entire accessible population, however, does not create a probability sample of all pesantren-based schools in Indonesia. Generalisation remains limited to schools with comparable institutional and contextual characteristics.

Table 1. Population and Sample Distribution

No.	School	Teachers
1	SMP Islam Bustanu Ulum Ketanggungan	13
2	SMP IT At Taqwa Ketanggungan	14
3	SMP Nurul Hayah Ketanggungan	25
4	SMP Mubarakul Ulum Banjarharjo	13
5	SMP IT Manarul Huda Banjarharjo	5
6	SMP Bustanul Falah Banjarharjo	5
7	SMP Terpadu Riyadul Mubarak Banjarharjo	5
8	SMP NU Hasyim Asy'ari	5
9	SMP Tahfidul Quran Nuridin Idris Larangan	25
Total		110

Table 1 shows that the number of teachers in each school ranged from 5 to 25. All 110 teachers were included, ensuring that the smaller schools remained represented in the analysis. Every returned questionnaire was complete and eligible for analysis. The analysed sample was therefore identical to the accessible population.

The questionnaire was developed from the definitions and dimensions used in the study. Collaborative supervision was measured by 27 items covering planning, implementation, and follow-up. Planning addressed teacher involvement in scheduling, setting goals, identifying instructional needs, and selecting observation indicators. Implementation addressed two-way dialogue, democratic interaction, focused classroom observation, and clear, constructive feedback. Follow-up addressed agreed improvement actions, continuing assistance, repeat observation where necessary, and the use of supervision results for professional development. This structure follows Glickman et al. (2014), who view supervision as a shared responsibility in diagnosing instructional problems and deciding how teaching can be improved.

Religious leadership was measured by 39 items assessing a principal's conduct in managing the school rather than personal piety or ritual activity alone. The indicators covered moral-spiritual role modelling, integrity and responsibility, fairness in the allocation of work and opportunities, attention to teachers' difficulties, reinforcement of religious culture, openness to teachers' views, and transparent, value-based decisions. These indicators translate religious values into policies and working relationships that teachers can assess. Teacher innovation was measured by 36 items covering acceptance of ideas, adoption, implementation, development or modification, evaluation and reflection, and dissemination of effective practice. The structure follows Rogers (2003), who describes innovation as a process involving knowledge, decision, implementation, confirmation, and diffusion.

Table 2. Instrument Operationalisation and Reliability

Variable	Dimensions	Items	Alpha
Collaborative supervision	Planning; implementation; follow-up	27	.959
Religious leadership	Role modelling; integrity; care; culture; decisions; development	39	.972
Teacher innovation	Awareness; adoption; implementation; modification; evaluation; dissemination	36	.969

Table 2 summarises the 102 items used to measure the three variables. The pilot reliability coefficients were .959 for collaborative supervision, .972 for religious leadership, and .969 for teacher innovation. All three coefficients indicate very high internal consistency. Reliability, however, was not used as the sole basis for judging instrument quality. Item retention also considered whether the content matched the definition and dimensions of each variable. This interpretation is consistent with Taber, (2018), who cautions that Cronbach's alpha should be read alongside the theoretical coverage and content of an instrument.

The instruments were piloted with 30 teachers who were not among the 110 respondents in the main study. The pilot participants had comparable occupational and school characteristics and completed a questionnaire with the same structure as the main-study instrument. With $n=30$ and $df=28$, the critical product-moment correlation at the 5% significance level was .361. Every item exceeded this criterion and was retained. The pilot responses were then used to calculate the Cronbach's alpha coefficients reported in Table 2. Data from the 30 pilot participants were used only for instrument testing, whereas data from the 110 main respondents were used for descriptive analysis, assumption testing, and regression. Data from the two groups were not combined at any stage of the analysis.

Data collection was coordinated with each school after institutional permission had been obtained. Prospective respondents received information about the study purpose, voluntary participation, data confidentiality, and the reporting of aggregated results. Completed questionnaires were checked before coding. The main dataset contained no missing values, and all item scores fell within the five-point Likert range. Respondent names were replaced with codes during the analysis. These procedures were intended to reduce administrative pressure and ensure that individual teachers' responses would not be reported to their principals.

Two forms of scores were used for different analytical purposes. Total scores before transformation were retained for descriptive statistics and category classification because they could be interpreted against the original instrument ranges. For regression, each item was transformed using the Method of Successive Interval (MSI), and the resulting values were summed for each variable. S. Ningsih & Dukalang, (2019) describe MSI as a method for deriving approximately interval-level values from ordinal responses. Consequently, the means in the descriptive table and the regression coefficients are expressed in different units. The B coefficients in the regression table refer to summed MSI scores rather than total scores before transformation.

The analysis was completed in four stages. First, minimum and maximum scores, means, standard deviations, frequencies, and categories were calculated from total scores before transformation. Second, residual normality was examined using the one-sample Kolmogorov-Smirnov test and verified with a Monte Carlo significance estimate. Third, linearity was assessed using the significance of deviation from linearity. Multicollinearity was examined through tolerance and variance inflation factors (VIF), while heteroscedasticity was tested by regressing the absolute residuals on both predictors in a Glejser test. Because the linearity test created many groups from the range of predictor scores, it was treated as a preliminary diagnostic. A non-significant result indicated no detected departure from linearity, but did not by itself prove a perfectly linear relationship.

Finally, multiple linear regression was conducted using the summed MSI scores. H1 and H2 were evaluated from the unstandardised B coefficient, standard error, standardised beta, t value, p value, and 95% confidence interval. H3 was evaluated using F, R, R², adjusted R², and the standard error of estimate. Statistical significance was set at .05. Coefficient magnitudes and confidence intervals were reported so that interpretation did not rely on p values alone. The intercept was retained in the model but was not given a substantive interpretation because a score of zero on both predictors fell outside the observed data range.

3. FINDINGS AND DISCUSSIONS

Findings

Data from all 110 respondents in the main study were included in the analysis. Total scores before transformation ranged from 85 to 135 for collaborative supervision, 138 to 195 for religious leadership, and 106 to 177 for teacher innovation. The respective means were 117.45, 172.05, and 143.29, with standard deviations of 10.53, 14.49, and 13.76. No respondent was classified in the low category. Detailed descriptive statistics and category distributions are presented in Table 3.

Table 3. Raw-Score Descriptive Statistics and Categories (N=110)

Variable	Min	Max	Mean	SD	Moderate	High
Collaborative supervision	85	135	117.45	10.53	4 (3.6%)	106 (96.4%)
Religious leadership	138	195	172.05	14.49	2 (1.8%)	108 (98.2%)
Teacher innovation	106	177	143.29	13.76	20 (18.2%)	90 (81.8%)

Table 3 shows that 106 teachers (96.4%) rated collaborative supervision as high and 4 (3.6%) as moderate. Religious leadership was rated high by 108 teachers (98.2%) and moderate by 2 (1.8%). For teacher innovation, 90 respondents (81.8%) were in the high category and 20 (18.2%) in the moderate category. The moderate category was therefore 14.6 percentage points larger for innovation than for collaborative supervision and 16.4 points larger than for religious leadership. The findings section reports this distributional difference; possible explanations are considered in the discussion.

The values in Table 3 were calculated from total scores before transformation. For regression, the means of the summed MSI scores were 83.607 for collaborative supervision, 126.978 for religious leadership, and 95.765 for teacher innovation. The standard deviation of the MSI teacher-innovation score was 20.979. This distinction prevents the means in Table 3 from being compared directly with regression coefficients expressed in MSI units. Because no data were missing, the assumption tests and regression analyses included all 110 respondents.

Table 4. Summary of Regression Diagnostics

Diagnostic	Statistic	Decision
Residual normality	K-S=.066; asymptotic p=.200; Monte Carlo p=.279, 99% CI [.267, .290]	No departure detected
Linearity X1-Y	Deviation from linearity p=.260	No nonlinearity detected
Linearity X2-Y	Deviation from linearity p=.245	No nonlinearity detected
Multicollinearity	Tolerance=.997; VIF=1.003 for X1 and X2	No concern

Diagnostic	Statistic	Decision
Heteroscedasticity	Simultaneous Glejser: X1 p=.713; X2 p=.583	Not indicated

The results in Table 4 show that the model met the assumptions examined before multiple linear regression. The Kolmogorov–Smirnov test of the residuals produced a statistic of .066 with an asymptotic $p=.200$. The Monte Carlo estimate was $p=.279$ with a 99% confidence interval [.267, .290]. The deviation-from-linearity probabilities were .260 for X1–Y and .245 for X2–Y. Neither value indicated a significant departure from linearity, subject to the grouping limitation described in the methods. Both predictors had a tolerance of .997 and a VIF of 1.003. The Glejser test produced $p=.713$ for X1 and $p=.583$ for X2. No violation of residual normality, multicollinearity, or heteroscedasticity was detected that would prevent interpretation of the regression model.

Table 5. Multiple Linear Regression on Summed MSI Scores (N=110)

Predictor	B	SE	β	t	p	95% CI for B
Constant	-7.620	11.961	—	-.637	.525	[-31.330, 16.090]
Collaborative supervision	.592	.098	.446	6.023	<.001	[.397, .786]
Religious leadership	.425	.071	.444	6.000	<.001	[.284, .565]

Table 5 shows that collaborative supervision was positively and significantly associated with teacher innovation ($B=.592$, $SE=.098$, $\beta=.446$, $t=6.023$, $p<.001$, 95% CI [.397, .786]). Religious leadership was also positively and significantly associated with teacher innovation ($B=.425$, $SE=.071$, $\beta=.444$, $t=6.000$, $p<.001$, 95% CI [.284, .565]). Neither confidence interval included zero. H1 and H2 were therefore supported after the other predictor had been controlled. The regression equation in MSI units was $Y=-7.620+.592X1+.425X2$. The standardised beta coefficients differed by only .002, indicating that the two predictors had almost equal relative strength in this sample.

The joint test produced a regression sum of squares of 19,947.435 and a residual sum of squares of 28,023.297. The model was significant, $F(2,107)=38.082$, $p<.001$, supporting H3. R was .645, $R^2=.416$, adjusted $R^2=.405$, and the standard error of estimate was 16.183 MSI units. Collaborative supervision and religious leadership therefore explained 41.6% of the variation in teacher-innovation scores. The remaining 58.4% reflects factors outside the model as well as measurement error. Because these factors were not measured, the unexplained variation cannot be attributed directly to any single variable.

In summary, the analysis produced three main findings. First, each predictor was positively associated with teacher innovation after the other predictor had been controlled. Second, collaborative supervision and religious leadership jointly formed a significant regression model. Third, high ratings of supervision and leadership were more common than high teacher-innovation scores. These findings describe statistical patterns and do not establish a causal process. Their theoretical and contextual implications are considered in the following discussion.

Discussion

The positive relationship between X1 and Y indicates that teachers who experienced more collaborative supervision tended to report greater innovation after religious leadership was controlled. This relationship can be understood through teachers' involvement throughout the supervision process. Joint planning brings actual classroom problems into the development agenda. Observation provides evidence about teaching and learning, while the post-observation dialogue allows teachers and principals to interpret that evidence together. Follow-up then turns reflection into an improvement that can be tried and reviewed. This sequence is consistent with the developmental supervision proposed

by Glickman et al. (2014). De Jong et al. (2022) likewise show that teacher collaboration is more productive when it addresses instructional problems over time, and Weddle, (2022) stresses the importance of connecting collaborative activity with classroom evidence and practice.

Previous studies have more often linked collaborative supervision to teacher competence or performance. Purwaningsih et al. (2023) highlighted teacher participation and supervision follow-up in improving performance, whereas Subagio et al. (2024) emphasised reflection and sustained assistance in curriculum implementation. Suwardi et al., (2020) found that a collaborative model could strengthen supervision competence, and Saman and Hasanah (2024) positioned academic supervision as a means of professional development. The present study extends those findings because its outcome was not supervision competence but teachers' behaviour in accepting, applying, developing, evaluating, and sharing new practices. The value of collaborative supervision, therefore, may extend beyond improving what teachers know to supporting how they use that knowledge to renew instruction.

The three X1 dimensions need to operate as one sequence. Planning without observation risks producing goals that are too general. Observation without dialogue may be experienced as one-sided judgement, whereas dialogue without follow-up produces suggestions that are never tested. Susanto et al. (2025) identify assistance after the classroom visit as an important part of supervision, and Piandani et al., (2025) similarly connect planning, observation, reflection, and follow-up. The meta-analysis by Kraft et al. (2018) supports this explanation by showing that professional coaching is more useful when feedback is specific and sustained through repeated cycles. Improving supervision should therefore involve more than increasing the number of classroom visits; each visit should lead to dialogue and a clear improvement action.

In pesantren-based schools, supervision needs to address the national curriculum and the pesantren programme at the same time. A new idea may have to be adjusted to prayer and boarding schedules, available devices, student characteristics, and policies set by the foundation or kiai. These considerations are better discussed openly during supervision than treated as fixed obstacles. Principals and teachers can distinguish an idea that is pedagogically weak from a sound idea that needs contextual adaptation. They can also agree on realistic evidence of success, such as stronger student engagement, better-quality work, improved mastery, or broader participation in discussion. This approach safeguards the pesantren's identity while allowing responsible instructional renewal.

The positive relationship between X2 and Y shows that religious leadership remained associated with teacher innovation after collaborative supervision was controlled. Its standardised coefficient was almost identical to that of collaborative supervision. This result should not be read as evidence that a principal's personal piety automatically produces innovation. The instrument assessed leadership practices that teachers could observe and experience, including role modelling, consistency, responsibility, fairness in distributing duties, responsiveness to difficulties, openness to teachers' views, transparent decisions, and concern for the common good. Fry (2003) explains that spiritual leadership builds meaning and commitment through vision, hope, and care. Oh & Wang, (2020) show that values become organisationally meaningful when they are evident in relationships and decision-making, while Samul (2020) stresses consistency between stated values and workplace practice.

Religious leadership can give teachers a sense of safety when they try a different way of teaching. Every experiment carries the possibility that its initial result will fall short of expectations. Teachers are more likely to voice ideas and difficulties when the principal makes decisions consistently, fairly, and in response to evidence. Under those conditions, a trial can be judged by its purpose and what is learned from it rather than by the teacher's personal closeness to the leader. Chen et al. (2022) found that moral leadership was associated with innovative behaviour through leader identification and psychological safety. Javed et al. (2019) reported a similar pattern for inclusive leadership. Reviews by Frazier et al., (2017) and Newman et al. (2017) further connect psychological safety with voice, learning, and performance.

Care also needs to take the form of practical assistance. A principal can listen to teachers' difficulties, remove avoidable barriers, and help them obtain relevant resources. Such support does not lower standards; it ensures that expectations for improvement are accompanied by the means to meet them. Eva et al., (2019) place the development of others at the centre of servant leadership, while cautioning that service needs to be embedded in consistent organisational practice rather than reduced to personal kindness. In this study, care was considered alongside integrity, fairness, and responsibility. Together, these qualities allow leaders to support innovation in a humane way without weakening professional accountability.

The finding is also relevant to the management of Islamic schools. Hidayat et al., (2025) describe religious leadership as a foundation for a humane and ethical organisational culture, while Rachmawati et al. (2023) emphasise the connection among vision, values, and leader conduct. Maulidin, (2024) demonstrates the importance of spiritual leadership in an Islamic school, and Umiarso & Muhith, (2019) explain the role of value-based authority in shaping pesantren culture. The present study adds evidence at the level of teacher behaviour. When religious values are visible in everyday decisions and working relationships, teachers tend to be more willing to develop, evaluate, and share instructional improvements.

The nearly identical beta coefficients suggest that collaborative supervision and religious leadership perform complementary functions. Supervision provides a process through which teachers can improve instruction, whereas religious leadership builds trust in and acceptance of that process. A positive work climate does not necessarily equip teachers to develop an idea when structured professional support is absent. Conversely, technically sound supervision may fail to elicit honest reflection if teachers fear unfair treatment or embarrassment when admitting difficulty. The findings therefore indicate that innovation in pesantren-based schools is supported by professional development and value-based leadership working together.

Comparison with previous research clarifies this contribution. Zainal and Mohd Matore (2021) explained innovation through self-efficacy and transformational leadership. Bao (2024) examined meaningful work and uncertainty avoidance, whereas Lin (2022) highlighted autonomy and professional collaboration under distributed leadership. Messmann et al., (2022) and Cui & Yin, (2023) showed the role of basic psychological needs. The present findings do not diminish the importance of these individual and motivational mechanisms. Instead, they identify two school-management practices that may support them: collaborative supervision can strengthen competence and autonomy through dialogue, while fair and caring religious leadership can foster meaning, relatedness, and safety.

The descriptive findings reveal an important discrepancy. Collaborative supervision was rated high by 96.4% of teachers and religious leadership by 98.2%, yet only 81.8% were in the high teacher-innovation category; the remaining 18.2% were moderate. Although the regression shows a positive relationship between individual scores, supportive organisational conditions do not automatically translate into innovative behaviour. Teachers also need knowledge, time, facilities, and opportunities to experiment. In addition, responses to X1 and X2 were limited to categories 3–5. The concentration of responses in the three upper categories left less variation in supervision and leadership scores than in teacher-innovation scores.

Digital competence is one possible explanation. Technology broadens access to learning resources and modes of interaction, but its use still requires pedagogical judgement. Falloon, (2020) describes teacher digital competence as a combination of technical, pedagogical, ethical, and professional capabilities. The review by Revuelta-Domínguez et al., (2022) similarly shows that digital competence for teaching has several dimensions and needs to be developed through deliberate programmes. Tang, (2021) found that ICT can encourage teacher innovation, although the relationship varies with teacher and school characteristics. Supportive leadership may therefore be insufficient to produce innovative teaching when teachers have limited technological competence or access.

The move to online teaching during the COVID-19 period showed that adaptation depends on prior competence and opportunities to learn. König et al., (2020) found that teacher competence and education were related to successful transition to online instruction. In pesantren-based schools, devices and internet connections may need to be shared across programmes, while technology use must be coordinated with pesantren schedules and student-protection requirements. Supervision can help teachers define a realistic pedagogical purpose for technology, but implementation still requires equipment, connectivity, practice time, and technical assistance. These constraints help explain why teachers who perceive supportive leadership do not necessarily display equally high levels of innovation.

Time and workload offer another explanation. Designing a new lesson, preparing media, observing the outcome, revising materials, and documenting the process all require sufficient time. Teachers in pesantren-based schools often combine classroom teaching with student guidance, religious programmes, administration, and communal responsibilities. Skaalvik & Skaalvik, (2018) show that job demands and available resources influence teacher motivation and well-being. Toropova et al., (2021) likewise link school working conditions to teachers' professional experience. Innovation may therefore remain moderate when collaboration is added to an existing workload without protected time in the schedule.

Motivation and pedagogical capability may also matter. Teachers need to believe that they can influence learning outcomes, understand the purpose of an experiment, and possess enough knowledge to evaluate its effects. Cui and Yin (2023) connect the fulfilment of competence, autonomy, and relatedness needs with innovation in professional training. Messmann et al. (2022) also identify basic psychological needs in the relationship between leadership and innovative behaviour, while Bao (2024) shows that contextual uncertainty can alter how leadership relates to innovation. The 18.2% of teachers in the moderate category should therefore not be assumed to resist change. They may need focused assistance, peer examples, early experiences of success, or a more gradual innovation target.

The school climate must also allow teachers to learn from imperfect results. Shanker et al., (2017) show that organisational climate can support performance through innovative work behaviour. Wan et al., (2021), by contrast, warn that an overly narrow focus on final outcomes can shift innovation away from learning and towards target attainment alone. A similar problem arises in schools when an experiment is valued only if it succeeds immediately or produces complete documentation. Principals need to distinguish ethically designed trials from careless practice. Agreement on boundaries, evidence, and review dates allows teachers to try something new while remaining accountable to students and the institution.

An R^2 of .416 indicates that collaborative supervision and religious leadership jointly explained 41.6% of the variation in teacher innovation. The model, however, does not include every factor associated with innovation. The unexplained variation may be related to self-efficacy, creativity, intrinsic motivation, subject knowledge, student characteristics, facilities, peer support, or school climate. The meta-analysis by Hughes et al. (2018) shows that relationships between leadership, creativity, and innovation vary across contexts. Lee et al., (2020) likewise demonstrate that organisational conditions and mechanisms affect the strength of these relationships. Collaborative supervision and religious leadership should therefore be understood as two important factors among several associated with teacher innovation.

Principals can act on these findings by establishing a regular supervision cycle and protecting time for collaboration. At the beginning of a semester, principals and teachers can use evidence of student learning to select a problem and identify a feasible idea to test. Classroom observation should use indicators agreed in advance. The post-observation meeting needs to produce a written plan specifying the action, required support, responsible persons, implementation period, and evidence of success. At the next meeting, the principal and teacher can decide whether the practice should be retained, revised,

or discontinued. Useful practices can then be shared through subject groups, lesson study, internal workshops, or a school digital repository.

Pesantren foundations and school supervisors need to ensure that policy and resources support this cycle. Collaboration time should be included in workload arrangements rather than left to teachers' spare time. Training, devices, internet access, teaching materials, and opportunities to lead pilot projects should be allocated using transparent criteria. Supervisors should check not only whether a classroom visit occurred but also whether planning, dialogue, assistance, and follow-up were completed. Foundations can reinforce the process by stating that instructional improvements serving students are compatible with pesantren values when they are carried out ethically and responsibly.

Religious values also need to be visible in everyday decisions. Principals model those values when they remain willing to learn, respond consistently to evidence, and take responsibility for the consequences of their policies. Fairness is evident in clear criteria for workload, training, resources, and recognition. Care takes the form of timely assistance without lowering professional standards. Openness gives teachers a respectful way to communicate difficulty or disagreement. These practices strengthen the credibility of institutional values; ceremonial religious messages alone are not enough to build support for innovation.

Teachers retain professional responsibility within this collaborative model. Collaboration does not mean that every idea must come from the principal or that teachers simply follow advice. Teachers need to bring evidence of student learning to supervision meetings, describe constraints honestly, test agreed alternatives, and record the outcome. Experiences that succeed, as well as those that do not, should become material for collective learning. Admiraal et al., (2021) show that professional learning communities are most useful when group activity is directly connected with teachers' work and a clear improvement purpose. Principals create supportive conditions, while teachers continue to exercise evidence-informed professional judgement.

The findings should be interpreted in light of several limitations. All variables were measured through questionnaires completed by teachers at a single point in time. This method may have encouraged socially desirable responses and introduced bias because the same method was used to measure every variable. Although the study included the entire accessible population, the respondents came from only nine schools in one coordinating region. The findings therefore cannot be generalised directly to pesantren-based schools with different characteristics. The very high alpha coefficients in the pilot study indicate consistency among the items, but they do not confirm the structure of each construct without factor analysis. Responses to X1 and X2 were also concentrated in the high categories, leaving relatively limited score variation. In the linearity tests, the range of scores created numerous groups with few observations in some groups. The results were therefore treated as a preliminary check of the relationship pattern rather than the sole basis for confirming linearity.

Data were collected at a single point in time, so the regression results cannot establish a causal relationship. The coefficients describe statistical associations between teacher-innovation scores and each predictor after the other predictor is controlled. The study cannot determine whether collaborative supervision and religious leadership preceded teacher innovation. A reciprocal relationship remains possible. More innovative teachers, for example, may seek greater opportunities for dialogue while also evaluating their principals' leadership more positively. Longitudinal data, repeated measurements, or quasi-experimental designs are needed to establish temporal order and direction. Multilevel analysis would also help separate individual teachers' experiences from school-level leadership, policy, and resource conditions.

4. CONCLUSION

The study found that collaborative supervision and religious leadership were each positively and

significantly related to teacher innovation among all 110 teachers in the nine participating pesantren-based junior high schools. Collaborative supervision produced $B=.592$ and $\beta=.446$, whereas religious leadership produced $B=.425$ and $\beta=.444$. The full model was significant, $F(2,107)=38.082$, $p<.001$, and explained 41.6% of the variation in teacher innovation. The nearly identical standardised coefficients indicate that professional development through supervision and value-based working relationships are both important. Because the data were collected once and relied on teacher reports, the findings indicate associations among the variables rather than causal relationships.

Principals and foundations should integrate collaborative supervision with religious leadership in school management. Protected collaboration time needs to be included in the work schedule. Classroom observation should be jointly planned, based on clear evidence, and followed by an improvement plan specifying actions, support, responsible persons, and a review date. Religious leadership should be demonstrated through role modelling, fairness in allocating resources and opportunities, transparent decisions, care, and openness to teachers' concerns. The 18.2% of teachers in the moderate innovation category need support suited to their needs in digital competence, instructional design, peer coaching, and manageable opportunities to try new practices. They should not automatically be viewed as resistant to change.

Future research should use longitudinal or quasi-experimental designs to examine the direction of the relationships. Multilevel models are needed to distinguish teacher-level from school-level factors, while multisource measurement can combine questionnaires with classroom observations, instructional documents, evidence of student learning, and reports from leaders or peers. Factor analysis should test the structure of the instruments in a larger sample. Further studies could also examine psychological safety, self-efficacy, basic psychological needs, digital competence, workload, and resources as mediators or moderators. These extensions would provide a clearer account of how collaborative supervision and religious leadership are associated with sustained instructional innovation.

REFERENCES

- Admiraal, W., Schenke, W., De Jong, L., Emmelot, Y., & Sligte, H. (2021). Schools as professional learning communities: what can schools do to support professional development of their teachers? *Professional Development in Education*, 47(4), 684–698. <https://doi.org/10.1080/19415257.2019.1665573>
- AlEsa, H. S., & Durugbo, C. M. (2022). Systematic review of innovative work behavior concepts and contributions. *Management Review Quarterly*, 72, 1171–1208. <https://doi.org/10.1007/s11301-021-00224-x>
- Bao, Y. (2024). The effect of principal transformational leadership on teacher innovative behavior: The moderator role of uncertainty avoidance and the mediated role of the sense of meaning at work. *Frontiers in Education*, 9, 1378615. <https://doi.org/10.3389/feduc.2024.1378615>
- Chen, J., Zheng, W., & Jiang, B. (2022). The impact of moral leadership on physical education teachers' innovation behavior: The role of identification with leader and psychological safety. *Frontiers in Psychology*, 13, 1030245. <https://doi.org/10.3389/fpsyg.2022.1030245>
- Cui, C., & Yin, Y. (2023). How professional training impacts teaching innovation among ideological and political teachers: The mediating and moderating role of basic psychological needs satisfaction. *Frontiers in Psychology*, 14, 1246951. <https://doi.org/10.3389/fpsyg.2023.1246951>
- de Jong, L., Meirink, J., & Admiraal, W. (2022). School-based collaboration as a learning context for teachers: A systematic review. *International Journal of Educational Research*, 112, 101927. <https://doi.org/10.1016/j.ijer.2022.101927>
- Eva, N., Robin, M., Sendjaya, S., van Dierendonck, D., & Liden, R. C. (2019). Servant leadership: A systematic review and call for future research. *The Leadership Quarterly*, 30(1), 111–132. <https://doi.org/10.1016/j.leaqua.2018.07.004>

- Falloon, G. (2020). From digital literacy to digital competence: The teacher digital competency (TDC) framework. *Educational Technology Research and Development*, 68, 2449–2472. <https://doi.org/10.1007/s11423-020-09767-4>
- Frazier, M. L., Fainshmidt, S., Klinger, R. L., Pezeshkan, A., & Vacheva, V. (2017). Psychological safety: A meta-analytic review and extension. *Personnel Psychology*, 70(1), 113–165. <https://doi.org/10.1111/peps.12183>
- Fry, L. W. (2003). Toward a theory of spiritual leadership. *The Leadership Quarterly*, 14(6), 693–727. <https://doi.org/10.1016/j.leaqua.2003.09.001>
- Gkontelos, A., Vaiopoulou, J., & Stamovlasis, D. (2022). Teachers' innovative work behavior scale: Psychometric properties of the Greek version and measurement invariance across genders. *Social Sciences*, 11(7), 306. <https://doi.org/10.3390/socsci11070306>
- Glickman, C. D., Gordon, S. P., & Ross-Gordon, J. M. (2014). *SuperVision and instructional leadership: A developmental approach* (9th ed.). Pearson.
- Hidayat, W., Junaidah, & Suhardi, M. (2025). Peran kepemimpinan religius dalam membangun budaya organisasi pendidikan yang humanis dan etis. *AJMPI*, 1(2), 89–99. <https://doi.org/10.62448/ajmpi.v1i2.315>
- Hughes, D. J., Lee, A., Tian, A. W., Newman, A., & Legood, A. (2018). Leadership, creativity, and innovation: A critical review and practical recommendations. *The Leadership Quarterly*, 29(5), 549–569. <https://doi.org/10.1016/j.leaqua.2018.03.001>
- Javed, B., Naqvi, S. M. M. R., Khan, A. K., Arjoon, S., & Tayyeb, H. H. (2019). Impact of inclusive leadership on innovative work behavior: The role of psychological safety. *Journal of Management & Organization*, 25(1), 117–136. <https://doi.org/10.1017/jmo.2017.3>
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, 43(4), 608–622. <https://doi.org/10.1080/02619768.2020.1809650>
- Kraft, M. A., Blazar, D., & Hogan, D. (2018). The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence. *Review of Educational Research*, 88(4), 547–588. <https://doi.org/10.3102/0034654318759268>
- Lee, A., Legood, A., Hughes, D., Tian, A. W., Newman, A., & Knight, C. (2020). Leadership, creativity and innovation: A meta-analytic review. *European Journal of Work and Organizational Psychology*, 29(1), 1–35. <https://doi.org/10.1080/1359432X.2019.1661837>
- Lin, Q. (2022). The relationship between distributed leadership and teacher innovativeness: Mediating roles of teacher autonomy and professional collaboration. *Frontiers in Psychology*, 13, 948152. <https://doi.org/10.3389/fpsyg.2022.948152>
- Maulidin, S. (2024). Kepemimpinan spiritual kepala sekolah: Studi di SMK Islam Al-Fadhila Demak. *VOCATIONAL: Jurnal Inovasi Pendidikan Kejuruan*, 4(4), 180–191. <https://doi.org/10.51878/vocational.v4i4.4251>
- Messmann, G., Evers, A. T., & Kreijns, K. (2022). The role of basic psychological needs satisfaction in the relationship between transformational leadership and innovative work behavior. *Human Resource Development Quarterly*, 33(1), 29–45. <https://doi.org/10.1002/hrdq.21451>
- Newman, A., Donohue, R., & Eva, N. (2017). Psychological safety: A systematic review of the literature. *Human Resource Management Review*, 27(3), 521–535. <https://doi.org/10.1016/j.hrmr.2017.01.001>
- Ningsih, S., & Dukalang, H. H. (2019). Penerapan metode suksesif interval pada analisis regresi linier berganda. *Jambura Journal of Mathematics*, 1(1), 43–53. <https://doi.org/10.34312/jjom.v1i1.1742>
- Oh, J., & Wang, J. (2020). Spiritual leadership: Current status and agenda for future research and practice. *Journal of Management, Spirituality & Religion*, 17(3), 223–248. <https://doi.org/10.1080/14766086.2020.1728568>

- Piandani, D. W., Sukamti, Pratomo, Warman, & Masrur, M. (2025). Implementation of a collaborative approach in class supervision as an effort to improve learning at SMKN 2 Bontang. *International Journal of Educational and Psychological Sciences*, 3(4), 475–484. <https://doi.org/10.59890/ijeps.v3i4.103>
- Purwaningsih, E., Najwa, K., Nahidah, N., Hariyadi, A., & Su'ad. (2023). Supervisi akademik dengan pendekatan kolaboratif dalam meningkatkan kinerja guru. *Equity in Education Journal*, 5(1), 30–36. <https://doi.org/10.37304/eej.v5i1.8257>
- Rachmawati, I., Laksana, E. P., & Rachmawati, N. R. (2023). Spiritual leadership: Konsep baru dalam kemampuan manajemen kepala sekolah. *Jurnal Pembelajaran, Bimbingan, Dan Pengelolaan Pendidikan*, 3(3), 272–281. <https://doi.org/10.17977/um065v3i32023p272-281>
- Revuelta-Domínguez, F.-I., Guerra-Antequera, J., González-Pérez, A., Pedrera-Rodríguez, M.-I., & González-Fernández, A. (2022). Digital teaching competence: A systematic review. *Sustainability*, 14(11), 6428. <https://doi.org/10.3390/su14116428>
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Rumainur, R., Fauzan, U., & Malihah, N. (2022). Characteristics of Islamic religious education in boarding school curriculum. *Southeast Asian Journal of Islamic Education*, 4(2), 197–207. <https://doi.org/10.21093/sajie.v4i2.4593>
- Saman, A. M., & Hasanah, E. (2024). Peran kepala sekolah dalam melaksanakan supervisi akademik sebagai upaya peningkatan kompetensi guru. *JlIP: Jurnal Ilmiah Ilmu Pendidikan*, 7(2), 1913–1920. <https://doi.org/10.54371/jiip.v7i2.2512>
- Samul, J. (2020). Spiritual leadership: Meaning in the sustainable workplace. *Sustainability*, 12(1), 267. <https://doi.org/10.3390/su12010267>
- Shanker, R., Bhanugopan, R., van der Heijden, B. I. J. M., & Farrell, M. (2017). Organizational climate for innovation and organizational performance: The mediating effect of innovative work behavior. *Journal of Vocational Behavior*, 100, 67–77. <https://doi.org/10.1016/j.jvb.2017.02.004>
- Skaalvik, E. M., & Skaalvik, S. (2018). Job demands and job resources as predictors of teacher motivation and well-being. *Social Psychology of Education*, 21(5), 1251–1275. <https://doi.org/10.1007/s11218-018-9464-8>
- Subagio, A., Waruwu, M., Enawaty, E., & Halida, H. (2024). Collaborative academic supervision as an effort to optimize teacher performance in the Independent Curriculum. *Riwayat*, 7(4), 2740–2753. <https://doi.org/10.24815/jr.v7i4.41505>
- Susanto, A. H., Sutopo, A., Wulandari, M. D., & Minsih, M. (2025). Supervisi akademik sebagai strategi penguatan kompetensi guru dalam pembelajaran kolaboratif. *Cetta: Jurnal Ilmu Pendidikan*, 8(3), 110–121. <https://doi.org/10.37329/cetta.v8i3.4196>
- Suwardi, Suyatno, & Arikunto, S. (2020). The effectiveness of a collaborative academic supervision model of principal and senior teachers in improving junior teachers' academic supervision competence. *Universal Journal of Educational Research*, 8, 7218–7226. <https://doi.org/10.13189/UJER.2020.082503>
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tang, Y. (2021). Does information and communication technology (ICT) empower teacher innovativeness: A multilevel, multisite analysis. *Educational Technology Research and Development*, 69(6), 3009–3028. <https://doi.org/10.1007/s11423-021-10052-1>
- Toropova, A., Myrberg, E., & Johansson, S. (2021). Teacher job satisfaction: the importance of school working conditions and teacher characteristics. *Educational Review*, 73(1), 71–97. <https://doi.org/10.1080/00131911.2019.1705247>
- Umiarso, U., & Muhith, A. (2019). Construction organizational culture in gender pesantren through kiai's transformational leadership. *Akademika: Jurnal Pemikiran Islam*, 24(1), 67–94. <https://doi.org/10.32332/akademika.v24i1.1614>

- Wan, W., Liu, L., & Wang, X. (2021). The bottom-line mentality of leaders in education and teachers' innovative behavior: The roles of relative deprivation and psychological safety. *Frontiers in Psychology, 12*, 689840. <https://doi.org/10.3389/fpsyg.2021.689840>
- Weddle, H. (2022). Approaches to studying teacher collaboration for instructional improvement: A review of literature. *Educational Research Review, 35*, 100415. <https://doi.org/10.1016/j.edurev.2021.100415>
- Zainal, M. A., & Mohd Matore, M. E. E. (2021). The influence of teachers' self-efficacy and school leaders' transformational leadership practices on teachers' innovative behaviour. *International Journal of Environmental Research and Public Health, 18*(12), 6423. <https://doi.org/10.3390/ijerph18126423>
- Zuhri, S., & Syamsi, A. (2023). Integration of Salaf Islamic boarding school education with modern school curriculum. *TARBIYA: Journal of Education in Muslim Society, 10*(1), 103–116. <https://doi.org/10.15408/tjems.v10i1.25577>

