ISEJ Indonesian Science Education Journal

ISSN Online: 2716-3350
https://siducat.org/index.php/isej/
Published by Yayasan Darussalam Bengkulu
This article licensed under CC BY 4.0 International
OPEN ACCESS ARTICLE

Teacher Engagement and Adversity Quotient as Predictors of Academic Supervision in Vocational Schools in Pesisir Selatan Regency

Fetmawati[1], Hanif Al Kadri[2], Nellitawati[3], and Merika Setiawati[4]
Educational Administration, Universitas Negeri Padang, Padang, Indonesia[1,2,3,4]
E-mail Corresponding: hanifalkadri@fip.unp.ac.id

Received: Juni 17, 2026	Revised: Agustus 30, 2026	Accepted: September 22, 2026

Abstract
Academic supervision is an important strategy for improving teacher professionalism and learning quality in Vocational High Schools (SMK). This cross-sectional explanatory study examined whether Teacher Engagement and Adversity Quotient predict teacher-reported Academic Supervision among vocational high school teachers in Pesisir Selatan Regency. The population comprised 586 teachers, and 234 respondents were selected through proportionate simple random sampling. Data were collected using a 48-item five-point Likert questionnaire and analyzed with multiple linear regression in IBM SPSS. Teacher Engagement was a positive predictor of Academic Supervision ($B = 1.211$, $SE = .060$, $\beta = .866$, 95% CI [1.093, 1.329], $p < .001$), as was Adversity Quotient ($B = .858$, $SE = .057$, $\beta = .462$, 95% CI [.746, .970], $p < .001$). The overall model was significant, $F(2, 231) = 356.425$, $p < .001$, with $R^2 = .755$ and adjusted $R^2 = .753$. Thus, the two predictors jointly explained approximately 75.5% of the variance in teacher-reported Academic Supervision. These findings indicate that Teacher Engagement and Adversity Quotient are strongly associated with how teachers perceive and participate in academic supervision; however, the cross-sectional design does not establish causality. School leaders should therefore combine developmental supervision with strategies that strengthen teacher engagement and adaptive coping.

Keywords: Academic Supervision; Adversity Quotient; Teacher Engagement; Vocational Education; Vocational High School Teachers

INTRODUCTION

Vocational High Schools (SMK) play a strategic role in preparing graduates with the skills required by a rapidly changing labor market. In Indonesia, strengthening the quality of vocational education has become an important policy priority, particularly in aligning school-based learning with industry needs and improving the professional capacity of teachers (Ariansyah et al., 2024; Suroto & Hung, 2018; Yoana et al., 2024). However, improvements in vocational education quality depend not only on curriculum relevance and learning facilities but also on the quality of teachers' instructional practices (Huang et al., 2024; Poniman et al., 2024; Waluyanti et al., 2018). In this context, academic supervision is an important mechanism for monitoring, supporting, and improving teachers' instructional performance. Effective supervision provides teachers with feedback, professional guidance, and opportunities to reflect on and improve their teaching practices. Therefore, strengthening academic supervision is essential for ensuring continuous improvement in teacher professionalism and learning quality in vocational high schools.

One strategy used to improve teacher professionalism is through academic supervision. Academic supervision is a professional development process aimed at helping teachers improve the quality of learning through continuous observation, feedback, reflection, and follow-up (Glickman et al., 2018; Sergiovanni et al., 2014). Effective supervision is no longer viewed as an

inspection activity, but rather as a collaborative process that encourages teachers to continuously improve their learning (Huang et al., 2024; Poniman et al., 2024).

Previous studies have demonstrated that academic supervision is associated with improvements in teachers' pedagogical competence, instructional innovation, and professionalism (Purwanto, 2021; Wahyudi, 2020). These studies have primarily examined academic supervision from the perspective of its implementation, supervisory practices, and contribution to teacher professional development (Al-Kiyumi & Hammad, 2019; Noor et al., 2020; Richter et al., 2021). However, their findings provide limited explanation of the teacher-level factors that may determine how actively and constructively teachers participate in the supervision process. In particular, previous studies have not sufficiently examined whether teachers' work engagement and adversity quotient contribute to the effectiveness of academic supervision (Fernandes et al., 2019; Ke et al., 2019; Tamah & Wirjawan, 2022; D. Zhang et al., 2021). This limitation leaves an important question unresolved: whether academic supervision outcomes are shaped not only by the quality of supervisory practices but also by teachers' willingness to participate and their capacity to respond positively to difficulties encountered during the supervision process.

The unresolved issue is particularly relevant in vocational high schools in Pesisir Selatan Regency. Initial observations indicate that academic supervision tends to emphasize administrative compliance, while teachers' active participation in the supervisory process remains limited (Boldrini et al., 2019; Jin et al., 2023; Maisyaroh et al., 2021). Some teachers prepare learning materials mainly before supervision, feel anxious when being supervised, are less open in discussing instructional difficulties, and do not consistently implement supervisory recommendations. These conditions suggest that differences in teacher engagement and the ability to cope with challenges may influence how effectively academic supervision is implemented (Barnová et al., 2023; Duan et al., 2025; Widodo et al., 2022). Nevertheless, previous research has rarely tested teacher engagement and adversity quotient simultaneously as predictors of academic supervision, particularly among vocational high school teachers in Indonesia. Therefore, the present study addresses this empirical gap by developing and testing a model that examines the effects of teacher engagement and adversity quotient on academic supervision. This model provides empirical evidence on whether these two teacher-level factors can significantly explain variations in the implementation of academic supervision (Cansoy et al., 2025; Zhou et al., 2022).

Preliminary information was obtained through informal observations, field notes, and preliminary discussions with teachers and school principals in vocational high schools in Pesisir Selatan Regency (Collie, 2023; Dorukbaşi & Cansoy, 2024; OECD, 2024; Thien & Liu, 2024). These initial observations suggested that academic supervision tended to emphasize administrative requirements rather than continuous professional development. During the preliminary stage, several teachers reported that they commonly prepared learning materials shortly before scheduled supervision and experienced anxiety during supervisory activities. Discussions with teachers also indicated that opportunities to openly discuss instructional difficulties and follow up on supervisory recommendations were not always optimal. Some teachers perceived supervision primarily as an evaluative activity rather than as an opportunity for professional development (Acheson & Gall, 2018; Hidayat & Suryana, 2022). These preliminary observations were used to provide contextual information and identify the research problem, rather than as the primary empirical evidence of the study. They provide an initial basis for examining whether teacher engagement and adversity quotient are associated with the implementation of academic supervision.

Theoretically, Developmental Supervision Theory explains that the success of supervision is influenced by teachers' readiness and individual characteristics, not solely by supervisors' technical abilities (Sergiovanni et al., 2014). From a work-engagement perspective, Teacher Engagement reflects the extent to which teachers invest energy, dedication, and sustained attention in their professional roles. Teachers with stronger engagement are therefore more

likely to participate actively in supervision, attend to feedback, reflect on their practice, and follow through on improvement plans (Lammassaari et al., 2022; Schaufeli & Bakker, 2010).

In addition to engagement, Adversity Quotient is a potential teacher-level resource in the supervision process. Stoltz (2020)conceptualizes Adversity Quotient as an individual's capacity to persist, adapt, and respond constructively when facing pressure or challenge. In academic supervision, this capacity may help teachers receive critical feedback without becoming defensive, sustain effort during instructional improvement, and adapt to changing professional demands. Contemporary evidence likewise links resilience, self-efficacy, reflection, and work engagement with more adaptive responses to demanding teaching contexts (Mu et al., 2024; Wang et al., 2023).

Previous studies have examined teacher engagement, adversity quotient, and academic supervision from different perspectives. Studies on teacher engagement have shown that teachers who are more cognitively, emotionally, and behaviorally engaged tend to demonstrate greater commitment to their professional responsibilities and are more actively involved in school activities. Other studies have found that adversity quotient is associated with teachers' ability to cope with difficulties, maintain persistence, and respond constructively to challenging work situations. Meanwhile, research on academic supervision has primarily examined supervisory practices, principal competence, and the contribution of supervision to teacher professional development. These studies provide important evidence that teacher engagement, adversity quotient, and academic supervision are each relevant to teacher performance and professional development; however, they have generally been examined as separate constructs.

The separation of these research streams leaves an important empirical gap. Existing studies typically treat Teacher Engagement, adversity-related coping, and Academic Supervision as separate domains, leaving limited evidence on their joint contribution to supervision from the teacher perspective, particularly in vocational schools. The novelty of this study lies in integrating Teacher Engagement and Adversity Quotient into a single predictive model of teacher-reported Academic Supervision in Indonesian vocational schools. This framing is theoretically relevant because engagement may shape teachers' active participation in feedback and follow-up, whereas Adversity Quotient may support persistence and constructive responses to supervisory challenges. The model therefore extends the discussion of supervision beyond supervisor competence by examining teacher-level behavioral and psychological resources.

Accordingly, this study aims to examine the predictive relationships of Teacher Engagement and Adversity Quotient with teacher-reported Academic Supervision among vocational high school teachers in Pesisir Selatan Regency. The study is expected to contribute empirical evidence on teacher-level factors associated with supervision and to inform more developmental, participatory, and psychologically supportive supervision practices.

METHODS

This study employed a quantitative, cross-sectional explanatory design to examine the predictive relationships of Teacher Engagement and Adversity Quotient with teacher-reported Academic Supervision among vocational high school (SMK) teachers in Pesisir Selatan Regency. Because all variables were measured at a single time point, the analysis was designed to estimate associations and prediction rather than causal effects (Creswell & Poth, 2018).

The study population comprised 586 vocational high school teachers distributed across 17 schools in Pesisir Selatan Regency. The sampling frame was developed from official teacher lists obtained from the participating schools. Based on the Krejcie & Morgan (1970) table, a minimum sample of 234 respondents was required for a population of 586; therefore, 234 teachers were included in the final analysis. Proportionate simple random sampling was implemented by allocating the sample to each school according to its teacher population and then randomly selecting eligible teachers within each school. The final analytic sample comprised 234 teachers from 17 schools.

Data were collected using a closed-ended 48-item questionnaire comprising Academic

Supervision (Y; 20 items), Teacher Engagement (X_1; 15 items), and Adversity Quotient (X_2; 13 items). Academic Supervision was operationalized as teachers' perceptions of the planning, implementation, feedback, and developmental follow-up of supervision they experienced at school. Teacher Engagement captured active professional involvement, including vigor, dedication, and absorption, whereas Adversity Quotient represented teachers' capacity to manage and persist through professional difficulties. Items were rated on a five-point Likert scale. Before the main study, the instrument was reviewed for content relevance and clarity and pilot-tested with 30 vocational high school teachers outside the research sample. Item validity was assessed using Pearson Product Moment correlations (critical r = .361), and internal consistency was evaluated with Cronbach's alpha using .70 as the minimum acceptable criterion. The pilot test indicated that the items met the stated validity and reliability criteria and were retained for the main study.

Responses were coded according to item direction, with negatively worded items reverse-scored before analysis. Composite scores were calculated for each construct and analyzed using IBM SPSS Statistics 26. Descriptive statistics were used to summarize the study variables. Regression assumptions were evaluated through residual normality, heteroscedasticity, linearity, and multicollinearity diagnostics. Multiple linear regression was then used to estimate the unique and joint predictive relationships of Teacher Engagement and Adversity Quotient with Academic Supervision. Results are reported using unstandardized coefficients (B), standard errors (SE), standardized coefficients (β), 95% confidence intervals, t statistics, model F statistics, R^2, and adjusted R^2. Because the data were collected from the same respondents through a single self-report survey and respondents were nested within 17 schools, possible common-method variance and school-level dependence were considered when interpreting the results; no causal inference was made.

RESULT AND DISCUSSION

Result

The research instrument consisted of 48 Likert-scale statements with five response alternatives: Always, Often, Sometimes, Rarely, and Never. A total of 234 vocational high school teachers were included in the analysis. The instrument measured Academic Supervision (Y), Teacher Engagement (X_1), and Adversity Quotient (X_2). The Respondent Achievement Level (TCR) was calculated by comparing the mean score with the maximum possible score. Descriptive statistics are presented in Table 1.

Table 1. Descriptive Statistics and Respondents' Achievement Level

Variable	Score Range	Mean	SD	TCR (%)	Category
Academic Supervision (Y)	45–100	82.81	14.961	74.0	Fairly Good
Teacher Engagement (X1)	32–75	61.08	10.693	75.2	Fairly Good
Adversity Quotient (X2)	31–65	53.74	8.060	69.9	Fairly Good

All three variables were in the "Fairly Good" category. For Academic Supervision, Principal's Supervision Program Vision Planning had the highest TCR (76.8%), while Providing Constructive Feedback had the lowest (73.9%). For Teacher Engagement, Dedication was highest (75.8%) and Vigor lowest (73.7%). For Adversity Quotient, Control was highest (76.4%), whereas Self-Efficacy was lowest (56.0%), indicating a comparatively weak area in teachers' confidence when responding to professional demands.

Regression Assumption Tests

Before testing the hypotheses, the data were examined to assess the assumptions underlying the regression analysis. The diagnostic procedures included the Kolmogorov–Smirnov test for normality, the Glejser test for heteroscedasticity, linearity testing, and multicollinearity diagnostics using the Variance Inflation Factor (VIF) and Tolerance values. Normality was assessed based on the significance value of the Kolmogorov–Smirnov test and inspection of the

residual distribution, with a significance value greater than .05 indicating that the normality assumption was satisfied. Heteroscedasticity was evaluated using the Glejser test, where a significance value greater than .05 indicated the absence of a systematic relationship between the absolute residuals and the predictors. Linearity was assessed to confirm that the relationships between the independent and dependent variables were appropriately represented by linear functions. Multicollinearity was evaluated using VIF and Tolerance, with VIF values below 10 and Tolerance values above .10 indicating no serious multicollinearity. The results of these diagnostic tests are summarized in Table 2.

The variables were measured using multiple Likert-scale items, and the responses for each construct were aggregated into composite scores. These composite scores were treated as approximately continuous variables for regression analysis because they were derived from multiple items measuring the same underlying construct and provided a broader range of possible scores than individual Likert items. Accordingly, the use of composite scores was considered appropriate for examining the linear relationships among Academic Supervision (Y), Teacher Engagement (X_1), and Adversity Quotient (X_2). The assumption-testing results indicated whether the data met the requirements for subsequent regression analysis.

Table 2. Regression Assumption Tests

Test	Variables	Statistic/Value	p	Conclusion
Normality	Y, X1, X2	K–S	.200	Normally distributed
Heteroscedasticity	X1	Glejser	.311	No heteroscedasticity
	X2	Glejser	.258	No heteroscedasticity
Linearity	X1–Y	Deviation from Linearity	.073	Linear relationship
	X2–Y	Deviation from Linearity	.087	Linear relationship
Multicollinearity	X1, X2	VIF = 1.733; Tolerance = .577		No multicollinearity

All reported p values for the normality and heteroscedasticity tests exceeded .05, and the deviation-from-linearity tests for X_1–Y and X_2–Y were also non-significant, supporting the use of linear regression. The VIF of 1.733 and Tolerance of .577 indicated no serious multicollinearity. Taken together, the reported diagnostics did not indicate violations that would preclude multiple linear regression.

Hypothesis Testing

Hypothesis testing was conducted using bivariate Pearson correlations and multiple linear regression in SPSS 26. To improve interpretability, the regression results are reported with B, SE, standardized β, 95% confidence intervals, t statistics, and p values; overall model fit is summarized with R, R^2, adjusted R^2, and F.

Table 3. Multiple Linear Regression Results

Predictor	B	SE	β	t	p
Teacher Engagement (X_1)	1.211	.060	.866	20.206	< .001
Adversity Quotient (X_2)	.858	.057	.462	15.120	< .001

Bivariate correlations showed strong positive associations between Teacher Engagement and Academic Supervision ($r = .869$, $p < .001$) and between Adversity Quotient and Academic Supervision ($r = .868$, $p < .001$). In the multiple regression model, Teacher Engagement was a statistically significant positive predictor (B = 1.211, SE = .060, β = .866, 95% CI [1.093, 1.329], $t = 20.206$, $p < .001$). Adversity Quotient was also a statistically significant positive predictor (B = .858, SE = .057, β = .462, 95% CI [.746, .970], $t = 15.120$, $p < .001$). The regression equation was $Y = 8.316 + 1.211X_1 + .858X_2$.

The overall model was statistically significant, $F(2, 231) = 356.425$, $p < .001$, with $R = .869$, $R^2 = .755$, and adjusted $R^2 = .753$. Thus, approximately 75.5% of the variance in teacher-reported Academic Supervision was explained jointly by Teacher Engagement and Adversity Quotient, while approximately 24.5% remained unexplained by the model. The standardized coefficients

indicate that Teacher Engagement showed the stronger unique predictive contribution in this model. These estimates describe statistical prediction within the cross-sectional sample and should not be interpreted as causal effects.

Discussion

The results indicate that Teacher Engagement has a positive and statistically significant predictive relationship with Academic Supervision (B = 1.211, β = .866, p < .001). This finding suggests that teachers who are more actively engaged in their professional responsibilities also tend to report more constructive participation in the academic supervision process. The relationship can be understood through the dimensions of vigor, dedication, and absorption. Vigor reflects energy and persistence that may support sustained involvement in supervision, dedication may strengthen teachers' willingness to perceive supervision as a form of professional learning, and absorption may facilitate greater attention to feedback and follow-up actions. Because the study employed a cross-sectional design, these mechanisms should be interpreted as theoretically plausible explanations rather than demonstrated causal pathways.

The descriptive findings reinforce this interpretation. Dedication achieved the highest achievement level (75.8%), whereas vigor showed the lowest value (73.7%). This pattern suggests that teachers may demonstrate relatively strong professional commitment while still experiencing challenges in maintaining energy and persistence amid administrative responsibilities and everyday workload demands (Cansoy et al., 2025; in de Wal et al., 2020; Zhou et al., 2022). The comparatively lower level of vigor therefore represents an important area for strengthening teacher engagement. Supportive working conditions, manageable workloads, collegial collaboration, and access to meaningful professional development may help teachers sustain the energy required to participate actively in supervision and follow through on instructional improvement recommendations (Cai et al., 2022; Drouin-Rousseau et al., 2024; Liu & Yin, 2023; Uslukaya & Demirtas, 2024).

These findings are consistent with research showing that teacher work engagement is closely related to professional functioning under changing work demands (Lammassaari et al., 2022). Granziera et al. (2023)further indicated that engagement-related factors are relevant to teachers' participation in professional learning, while Collie & Martin (2023) linked teacher well-being and relational resources with professional functioning. Taken together, these studies support the interpretation of engagement as an important motivational resource that may help teachers attend to supervisory feedback, reflect on practice, and sustain instructional improvement. Accordingly, academic supervision may become more developmental when it is designed not merely as an evaluative activity, but as a process that encourages participation, professional reflection, and sustained follow-up.

The practical implications are therefore closely related to how school principals structure the supervision process. Academic supervision should provide constructive feedback, opportunities for professional reflection, and follow-up support rather than relying primarily on inspection or evaluation (Hosseingholizadeh et al., 2023; McTigue et al., 2024; Skaalvik & Skaalvik, 2018). Principals may strengthen dedication by recognizing teachers' professional contributions and connecting supervision activities with meaningful instructional goals. Vigor and absorption may be supported through collaborative professional learning, adequate work support, reasonable workload management, and opportunities for teachers to engage more deeply with instructional improvement (Gaikhorst et al., 2019; Poulou et al., 2023; Y. Zhang et al., 2024). Such conditions may increase the likelihood that supervisory feedback is accepted, critically reflected upon, and translated into sustained improvements in teaching practice.

In addition to Teacher Engagement, Adversity Quotient also showed a positive and statistically significant predictive relationship with Academic Supervision (B = .858, β = .462, p < .001), supporting the second hypothesis. This pattern suggests that teachers who report a stronger capacity to manage pressure, adapt to change, and persist through work-related challenges also tend to report more constructive engagement with academic supervision. The Control indicator achieved the highest TCR (76.4%), whereas Self-Efficacy was the lowest

(56.0%), indicating that confidence in handling professional demands remains an area requiring particular attention. Nevertheless, these associations should not be interpreted as evidence that Adversity Quotient directly causes more effective supervision.

This interpretation is consistent with evidence concerning teachers' adaptive psychological resources. Kim et al. (2022) documented the importance of adaptability and psychological resources in teachers' responses to demanding work contexts. Wang et al. (2023) linked self-efficacy, reflection, and resilience with teacher work engagement, while Mu et al. (2024) synthesized evidence indicating a moderate positive association between teacher self-efficacy and resilience. Together, these studies support viewing Adversity Quotient as an adaptive personal resource that may help teachers respond constructively to feedback, professional pressure, and instructional challenges. In this sense, Adversity Quotient may complement Teacher Engagement by helping teachers maintain their involvement when the supervision process requires persistence, adaptation, and openness to change.

The practical implication is that strengthening Adversity Quotient may be integrated into school-level human resource development. Principals can function not only as supervisors but also as coaches who support teachers' psychological resilience through mentoring, stress management, reflective dialogue, and self-efficacy development. By strengthening teachers' ability to cope with pressure and change, schools may create conditions in which teachers are better prepared to receive input, reflect on supervisory recommendations, and implement improvement efforts in their instructional practice.

When examined simultaneously, Teacher Engagement and Adversity Quotient provided substantial explanatory power for teacher-reported Academic Supervision. The regression model was statistically significant, $F(2, 231) = 356.425$, $p < .001$, with $R^2 = .755$ and adjusted $R^2 = .753$. Accordingly, the two predictors accounted for approximately 75.5% of the observed variance in Academic Supervision within this sample. The standardized coefficients, $\beta = .866$ for Teacher Engagement and $\beta = .462$ for Adversity Quotient, indicate that Teacher Engagement made the stronger unique contribution after both predictors were considered simultaneously. This result suggests that active professional involvement may be particularly important in explaining variation in teachers' perceptions of academic supervision, although the contribution of Adversity Quotient remains meaningful.

The joint contribution of these two predictors can be understood from their complementary roles. Teacher Engagement reflects the extent to which teachers are actively involved, committed, and willing to participate in professional activities, whereas Adversity Quotient reflects their capacity to remain persistent, adapt, and respond constructively when difficulties arise. Although conceptually distinct, the two constructs may operate together in practice. Teachers who are highly engaged may be more willing to participate in supervision, while teachers with stronger adaptive capacity may be better able to maintain that engagement when they encounter criticism, workload pressures, or demands for instructional change. Examining both variables simultaneously therefore provides a broader teacher-centered explanation of Academic Supervision than considering either factor independently.

This interpretation is consistent with evidence showing that work engagement supports active professional involvement and that resilience and self-efficacy are associated with adaptive responses to demanding teaching contexts (Amzat et al., 2022; Belay et al., 2022; Fu et al., 2022). From a theoretical perspective, developmental supervision requires both behavioral involvement and psychological readiness. Teachers need to participate actively in supervision, attend to feedback, reflect on their instructional practices, and persist when improvement is difficult. The joint model therefore offers a useful perspective on teacher-related factors associated with Academic Supervision while remaining complementary to research emphasizing supervisor competence, school leadership, organizational culture, and broader institutional conditions.

Overall, these findings suggest that improving Academic Supervision should not rely solely on refining supervisory procedures. Attention should also be directed toward teachers'

engagement and psychological capacity. Principals can promote more constructive participation through collaborative supervision, meaningful feedback, professional reflection, mentoring, and supportive communication, while professional development programs can strengthen teachers' persistence and adaptive responses to challenges. Such an integrated approach may contribute to a more developmental form of academic supervision in which teachers are not merely evaluated, but are actively involved in interpreting feedback, reflecting on their practices, and sustaining professional improvement.

CONCLUSION

Teacher Engagement and Adversity Quotient were both positively associated with teacher-reported Academic Supervision among vocational high school teachers in Pesisir Selatan Regency. In the multiple regression model, Teacher Engagement showed the stronger standardized predictive contribution (β = .866) relative to Adversity Quotient (β = .462), while the two predictors jointly accounted for approximately 75.5% of the observed variance (R^2 = .755; adjusted R^2 = .753). These findings extend the study of academic supervision by showing that teacher-level behavioral engagement and adaptive coping resources are statistically relevant alongside supervisory procedures and principal competence. Given the cross-sectional design, the findings indicate prediction and association rather than causation. Practically, academic supervision should be organized as a developmental process that encourages teacher participation, open communication, constructive feedback, reflection, and follow-up. Schools may support this process through collaborative professional learning, manageable work demands, mentoring, coaching, and opportunities that strengthen Teacher Engagement and adaptive responses to professional challenges. Such strategies should complement not replace improvements in supervisor competence and the quality of supervisory practice. Several limitations should temper interpretation. First, all constructs were measured using teacher self-report data collected at one time point, creating potential common-method variance and preventing temporal or causal inference. Second, respondents were nested within 17 schools, but school-level clustering was not modeled; future studies should consider multilevel analysis or cluster-robust standard errors. Third, the study was conducted in one regency, limiting generalizability beyond comparable vocational-school contexts. Future research should use longitudinal or mixed-method designs, independently validated construct measures, and additional school-level predictors such as leadership, organizational culture, communication, workload, and school climate.

REFERENCE

Acheson, K. A., & Gall, M. D. (2018). *Clinical supervision and teacher development: Preservice and inservice applications* (7th ed.). Wiley.

Al-Kiyumi, A., & Hammad, W. (2019). Instructional supervision in the Sultanate of Oman: Shifting roles and practices in a stage of educational reform. *International Journal of Leadership in Education, 22*(2), 237–249. https://doi.org/10.1080/13603124.2018.1543570

Amzat, I. H., Yanti, P. G., & Suswandari, S. (2022). Estimating the effect of principal instructional and distributed leadership on professional development of teachers in Jakarta, Indonesia. *SAGE Open, 12*(3), 1–19. https://doi.org/10.1177/21582440221109585

Ariansyah, K., Wismayanti, Y. F., Savitri, R., & others. (2024). Comparing labor market performance of vocational and general school graduates in Indonesia: Insights from stable and crisis conditions. *Empirical Research in Vocational Education and Training, 16*, 5. https://doi.org/10.1186/s40461-024-00160-6

Barnová, S., Gabrhelová, G., Krásna, S., Hasajová, L., & Barna, D. (2023). Teacher resilience and coping with teacher stress in vocational schools. *Societies, 13*(9), 204. https://doi.org/10.3390/soc13090204

Belay, S., Melese, S., & Seifu, A. (2022). Elevating teachers' professional capital: Effects of teachers' engagement in professional learning and job satisfaction, Awi District, Ethiopia. *SAGE Open, 12*(2), 1–15. https://doi.org/10.1177/21582440221094592

Boldrini, E., Sappa, V., & Aprea, C. (2019). Which difficulties and resources do vocational teachers perceive? An exploratory study setting the stage for investigating teachers' resilience in

Switzerland. *Teachers and Teaching, 25*(1), 125–141. https://doi.org/10.1080/13540602.2018.1520086

Cai, Y., Wang, L., Bi, Y., & Tang, R. (2022). How can the professional community influence teachers' work engagement? The mediating role of teacher self-efficacy. *Sustainability, 14*(16), 10029. https://doi.org/10.3390/su141610029

Cansoy, R., Türkoğlu, M. E., & Polatcan, M. (2025). Boosting classroom practices through principal feedback: The mediating roles of teacher professional learning and teacher self-efficacy. *European Journal of Education, 60*(4), e70265. https://doi.org/10.1111/ejed.70265

Collie, R. J. (2023). Teacher well-being and turnover intentions: Investigating the roles of job resources and job demands. *British Journal of Educational Psychology, 93*(3), 712–726. https://doi.org/10.1111/bjep.12587

Collie, R. J., & Martin, A. J. (2023). Teacher well-being and sense of relatedness with students: Examining associations over one school term. *Teaching and Teacher Education, 132*, 104233. https://doi.org/10.1016/j.tate.2023.104233

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE.

Dorukbaşi, E., & Cansoy, R. (2024). Examining the mediating role of teacher professional learning between perceived instructional leadership and teacher instructional practices. *European Journal of Education, 59*(3), e12672. https://doi.org/10.1111/ejed.12672

Drouin-Rousseau, S., Morin, A. J. S., Fernet, C., Blechman, Y., & Gillet, N. (2024). Teachers' profiles of work engagement and burnout over the course of a school year. *Applied Psychology, 73*(1), 57–92. https://doi.org/10.1111/apps.12465

Duan, S., Cui, J., Li, X., Wang, F., & Xia, M. (2025). Examining EFL vocational school teacher resilience in the Chinese context: A structural equation modeling approach. *Frontiers in Psychology, 16*, 1444979. https://doi.org/10.3389/fpsyg.2025.1444979

Fernandes, L., Peixoto, F., Gouveia, M. J., Silva, J. C., & Wosnitza, M. (2019). Fostering teachers' resilience and well-being through professional learning: Effects from a training programme. *The Australian Educational Researcher, 46*(4), 681–698. https://doi.org/10.1007/s13384-019-00344-0

Fu, C., Zhao, Z., Wang, H., Ouyang, M., Mao, X., Cai, X., & Tan, X. (2022). How perceived school culture relates to work engagement among primary and secondary school teachers? Roles of affective empathy and job tenure. *Frontiers in Psychology, 13*, 878894. https://doi.org/10.3389/fpsyg.2022.878894

Gaikhorst, L., März, V., du Pré, R., & Geijsel, F. (2019). Workplace conditions for successful teacher professional development: School principals' beliefs and practices. *European Journal of Education, 54*(4), 605–620. https://doi.org/10.1111/ejed.12366

Glickman, C. D., Gordon, S. P., & Ross-Gordon, J. M. (2018). *SuperVision and instructional leadership: A developmental approach* (10th ed.). Pearson.

Granziera, H., Wilson, J., & Wong, V. (2023). The effect of teacher engagement factors on teachers' lesson study professional development in Chinese school settings. *International Journal for Lesson and Learning Studies, 12*(4), 273–287. https://doi.org/10.1108/IJLLS-01-2023-0015

Hidayat, R., & Suryana, Y. (2022). *Pengaruh* adversity quotient *terhadap profesionalisme guru dalam menghadapi perubahan pembelajaran*. *Jurnal Administrasi Pendidikan, 29*(2), 145–158.

Hosseingholizadeh, R., Amrahi, A., & El-Farr, H. (2023). Instructional leadership, and teacher's collective efficacy, commitment, and professional learning in primary schools: A mediation model. *Professional Development in Education, 49*(3), 518–535. https://doi.org/10.1080/19415257.2020.1850510

Huang, L., Zhao, D., & Zhou, S. (2024). Examining principal instructional leadership effects on the rural-urban instructional quality gap in China: The mechanism of teacher professional learning. *Studies in Educational Evaluation, 81*, 101346. https://doi.org/10.1016/j.stueduc.2024.101346

in de Wal, J., van den Beemt, A., Martens, R. L., & den Brok, P. J. (2020). The relationship between job demands, job resources and teachers' professional learning: Is it explained by self-determination theory? *Studies in Continuing Education, 42*(1), 17–39. https://doi.org/10.1080/0158037X.2018.1520697

Jin, X., Tigelaar, D., van der Want, A., & Admiraal, W. (2023). The effects of a teacher development programme in Chinese vocational education on the efficacy and professional engagement of novice teachers. *Journal of Education for Teaching, 49*(2), 252–265. https://doi.org/10.1080/02607476.2022.2072713

Ke, Z., Yin, H., & Huang, S. (2019). Teacher participation in school-based professional development in

China: Does it matter for teacher efficacy and teaching strategies? *Teachers and Teaching: Theory and Practice, 25*(7), 821–836. https://doi.org/10.1080/13540602.2019.1662777

Kim, L. E., Oxley, L., & Asbury, K. (2022). "My brain feels like a browser with 100 tabs open": A longitudinal study of teachers' mental health and well-being during the COVID-19 pandemic. *British Journal of Educational Psychology, 92*(1), 299–318. https://doi.org/10.1111/bjep.12450

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Lammassaari, H., Hietajärvi, L., Salmela-Aro, K., Hakkarainen, K., & Lonka, K. (2022). Exploring the relations among teachers' epistemic theories, work engagement, burnout and the contemporary challenges of the teacher profession. *Frontiers in Psychology, 13*, 861437. https://doi.org/10.3389/fpsyg.2022.861437

Liu, S., & Yin, H. (2023). Does school power distance matter for the effectiveness of professional learning communities in China? A multilevel moderated mediation analysis. *Teaching and Teacher Education, 134*, 104335. https://doi.org/10.1016/j.tate.2023.104335

Maisyaroh, Budi Wiyono, B., Hardika, Valdez, A. V., Mangorsi, S. B., & Canapi, S. P. T. (2021). The implementation of instructional supervision in Indonesia and the Philippines, and its effect on the variation of teacher learning models and materials. *Cogent Education, 8*(1). https://doi.org/10.1080/2331186X.2021.1962232

McTigue, E. M., Jensen, M. T., Gourvennec, A. F., & Solheim, O. J. (2024). The role of school leader support on teacher's engagement during intervention implementation. *International Journal of Leadership in Education*. https://doi.org/10.1080/13603124.2024.2358038

Mu, G. M., Gordon, D., Liang, J., Zhao, L., Aguilar Alonso, R., Juri, M. Z., Zhang, X., Vo, H., Gao, D., Hu, Y., & Xing, C. (2024). A meta-analysis of the correlation between teacher self-efficacy and teacher resilience: Concerted growth and contextual variance. *Educational Research Review, 45*, 100645. https://doi.org/10.1016/j.edurev.2024.100645

Noor, I. H. M., Herlinawati, & Sofyaningrum, E. (2020). The academic supervision of the school principal: A case in Indonesia. *Journal of Educational and Social Research, 10*(4), 81–93. https://doi.org/10.36941/jesr-2020-0067

OECD. (2024). *TALIS 2024: Teachers and school leaders as lifelong learners*.

Poniman, Desiga, H. I., Harianto, & Pangestu, F. A. (2024). How academic supervision enhances teacher professionalism through personality development? *COUNSENESIA Indonesian Journal of Guidance and Counseling, 5*(2). https://doi.org/10.36728/cijgc.v5i2.4007

Poulou, M. S., Reddy, L. A., & Dudek, C. M. (2023). Teachers and school administrators' experiences with professional development feedback: The classroom strategies assessment system implementation. *Frontiers in Psychology, 14*, 1074278. https://doi.org/10.3389/fpsyg.2023.1074278

Purwanto. (2021). *Supervisi akademik kepala sekolah dalam meningkatkan inovasi pembelajaran guru*. *Jurnal Manajemen Pendidikan, 16*(2), 117–128.

Richter, E., Kunter, M., Marx, A., & Richter, D. (2021). Who participates in content-focused teacher professional development? Evidence from a large scale study. *Frontiers in Education, 6*, 722169. https://doi.org/10.3389/feduc.2021.722169

Schaufeli, W. B., & Bakker, A. B. (2010). Defining and measuring work engagement: Bringing clarity to the concept. In A. B. Bakker & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 10–24). Psychology Press. https://doi.org/10.4324/9780203853047-6

Sergiovanni, T. J., Starratt, R. J., & Cho, V. (2014). *Supervision: A redefinition* (9th ed.). McGraw-Hill Education.

Skaalvik, E. M., & Skaalvik, S. (2018). Job demands and job resources as predictors of teacher motivation and well-being. *Social Psychology of Education, 21*, 1251–1275. https://doi.org/10.1007/s11218-018-9464-8

Stoltz, P. G. (2020). *Adversity quotient: Turning obstacles into opportunities* (Updated ed.). Wiley.

Suroto, S., & Hung, N. T. (2018). Management of an industry standard class in vocational high schools. *Jurnal Pendidikan Teknologi dan Kejuruan, 24*(1), 46–51. https://doi.org/10.21831/jptk.v24i1.14710

Tamah, S. M., & Wirjawan, J. V. D. (2022). Teachers' response to a challenge to change: A portrait of teacher resilience to a professional development program. *Power and Education, 14*(1), 17–34. https://doi.org/10.1177/17577438211052647

Thien, L. M., & Liu, P. (2024). Linear and nonlinear relationships between instructional leadership and teacher professional learning through teacher self-efficacy as a mediator: A partial least squares

analysis. *Humanities and Social Sciences Communications, 11*, 7. https://doi.org/10.1057/s41599-023-02500-5

Uslukaya, A., & Demirtas, Z. (2024). The relationships between supervisor and colleague support interaction with teacher presenteeism and work engagement: A multilevel moderated mediated analysis. *Current Psychology, 43*, 20948–20963. https://doi.org/10.1007/s12144-024-05918-5

Wahyudi. (2020). *Pengaruh supervisi akademik terhadap kompetensi pedagogik guru*. *Jurnal Pendidikan Indonesia, 9*(3), 401–412.

Waluyanti, S., Santoso, D., Munir, M., Wulandari, B., & Raduan, A. (2018). Professional development for vocational high school teachers through incremental teacher competence standards. *Jurnal Pendidikan Teknologi dan Kejuruan, 24*(2), 278–285. https://doi.org/10.21831/jptk.v24i2.18427

Wang, Y., Derakhshan, A., & Pan, Z. (2023). Self-efficacy, reflection, and resilience as predictors of work engagement among English teachers. *Frontiers in Psychology, 14*, 1160681. https://doi.org/10.3389/fpsyg.2023.1160681

Widodo, W., Gustari, I., & Chandrawaty, C. (2022). Adversity quotient promotes teachers' professional competence more strongly than emotional intelligence: Evidence from Indonesia. *Journal of Intelligence, 10*(3), 44. https://doi.org/10.3390/jintelligence10030044

Yoana, Auwalin, I., & Rumayya. (2024). The role of vocational education on unemployment in Indonesia. *Cogent Education, 11*(1), 2340858. https://doi.org/10.1080/2331186X.2024.2340858

Zhang, D., He, J., & Fu, D. (2021). How can we improve teacher's work engagement? Based on Chinese experiences. *Frontiers in Psychology, 12*, 721450. https://doi.org/10.3389/fpsyg.2021.721450

Zhang, Y., Chen, J., & Tsang, K. K. (2024). Responsible leadership, teacher recognition, and teacher emotional well-being: An investigation of gender differences. *Teachers and Teaching: Theory and Practice, 30*(6), 783–800. https://doi.org/10.1080/13540602.2023.2265831

Zhou, N., Tigelaar, D. E. H., & Admiraal, W. (2022). Vocational teachers' professional learning: A systematic literature review of the past decade. *Teaching and Teacher Education, 119*, 103856. https://doi.org/10.1016/j.tate.2022.103856