

A structural model of vocational pre-service teachers' quality via Tamansiswa values, motivation, and transformational leadership: PLS-SEM approach

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ABSTRACT

Improving the teaching quality of vocational pre-service teachers requires integrative strategies that combine cultural values, motivation, and leadership development. This study examines the direct and indirect effects of Tamansiswa teaching values and motivation on teaching quality, with transformational leadership as a mediating variable. A quantitative longitudinal ex post facto design was employed. Data were collected from 697 vocational pre-service teachers in Yogyakarta, Indonesia, using structured questionnaires measuring Tamansiswa teaching values, motivation, transformational leadership, and teaching quality through validated Likert-scale instruments. Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) to test measurement reliability, structural relationships, and mediation effects. The results indicate that motivation is the strongest predictor of teaching quality ($\beta = 0.880$), followed by transformational leadership ($\beta = 0.238$), while Tamansiswa teaching values show a smaller but significant direct effect ($\beta = 0.088$). Both Tamansiswa teaching values ($\beta = 0.287$) and motivation ($\beta = 0.399$) significantly enhance transformational leadership. Mediation analysis confirms that transformational leadership strengthens the effects of Tamansiswa teaching values and motivation on teaching quality. The structural model demonstrates good fit (SRMR = 0.056; NFI = 0.926). These findings position transformational leadership as a key mechanism through which indigenous values and motivation are translated into effective teaching practices. The study contributes to vocational teacher education by integrating culturally grounded values into a leadership-mediated model of teaching quality and recommends embedding value internalization, motivational support, and leadership development within pre-service teacher preparation programs.

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INTRODUCTION

Vocational Education (VE) is widely recognized as a strategic avenue for preparing students for the demands of the labor market (Billett, 2011). Designed to align educational outcomes with industry requirements, VE emphasizes practical knowledge, technical skills, and work readiness (Clarke & Winch, 2012). As a bridge between education and employment, vocational education is expected to equip graduates with competencies that meet industrial expectations while supporting economic growth through the development of a skilled workforce. However, despite its strategic role, vocational education continues to face persistent challenges in producing graduates whose competencies align with rapidly evolving labor market demands.

One of the most pressing issues in vocational education is the persistent gap between graduates' competencies and labor market expectations (Mutohhari et al., 2021; Sutiman et al., 2022). Many graduates remain unemployed, experience prolonged transitions into employment, or work in occupations unrelated to their vocational qualifications (Kurniawan et al., 2021). Previous studies have consistently reported mismatches between the competencies developed in vocational institutions and those required in real workplace settings (Nota et al., 2014; Nurtanto et al., 2021; Wibowo et al., 2022). Moreover, these challenges extend beyond employment rates to include job quality, career progression, and graduates' job satisfaction (Alayda et al., 2022; Nur et al., 2023). Although competency-based curricula, work-based learning, and curriculum synchronization with industry have been widely implemented (Sutiman et al., 2022), their impact remains inconsistent, indicating that curriculum reform alone is insufficient to improve graduate employability (Rodzalan et al., 2022).

Among the various factors influencing vocational education outcomes, teaching quality (TQ) has emerged as one of the most critical determinants because it translates curriculum objectives into meaningful learning experiences and workplace-relevant competencies (Goodwin & Kosnik, 2013). In vocational education, teaching quality reflects teachers' ability to integrate theoretical knowledge with practical applications, manage authentic learning environments, facilitate competency development, and inspire students toward professional excellence (Kholifah et al., 2023; Nurtanto et al., 2022). High-quality teaching enables students to acquire not only technical competencies but also problem-solving skills, adaptability, and professional attitudes required in increasingly dynamic industrial environments. Therefore, improving teaching quality has become a strategic priority for narrowing the gap between vocational education outcomes and labor market expectations.

Despite its importance, teaching quality among vocational pre-service teachers remains a significant concern. Many pre-service teachers enter teacher education programs with limited pedagogical knowledge, insufficient classroom experience, and inadequate exposure to evolving industrial practices (Dreer-Goethe, 2023; Ogbuanya & Shodipe, 2022). Empirical evidence further indicates that inadequate teacher preparation, weak instructional practices, and the absence of systematic mentoring and feedback frequently undermine teaching effectiveness in vocational institutions (Ade-Ojo et al., 2022). In Indonesia, these challenges are further exacerbated by policy limitations and administrative approaches that often position teacher professional development as a procedural requirement rather than a transformative learning process (Khuzainey et al., 2020; Susanto et al., 2019). Although mentoring programs, peer learning, and digital pedagogy training have been introduced to strengthen teachers' competencies (Van Katwijk et al., 2023), their effectiveness remains inconsistent in preparing future vocational teachers to respond to rapidly changing industrial demands (Dreer-Goethe, 2023).

These challenges suggest that improving teaching quality requires more than technical training and conventional professional development. One promising approach is the development of transformational leadership (TL) among vocational pre-service teachers. Transformational leadership is characterized by the ability to inspire, influence, intellectually stimulate, and provide individualized consideration, enabling individuals to achieve performance beyond expected standards (Jais et al., 2020; Yeap et al., 2020). In educational settings, transformational leadership theory explains that effective teachers create a shared vision, foster innovation, stimulate critical thinking, and support learners' professional development through inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence (Al Halbusi et al., 2021). These characteristics make transformational leadership particularly relevant for strengthening teaching quality in vocational education (Jan et al., 2021).

Previous studies have demonstrated that transformational leadership contributes positively to instructional quality by promoting pedagogical innovation, improving classroom engagement, and strengthening teachers' professional effectiveness (Johari et al., 2021). Nevertheless, cultivating transformational leadership among vocational pre-service teachers remains challenging because many teacher candidates lack sufficient confidence, leadership experience, and mentoring opportunities (Aziah Ismail et al., 2021; Li & Liu, 2022). Furthermore, transformational leadership is often implemented inconsistently due to hierarchical organizational cultures and limited leadership

development initiatives within teacher education programs (Sliwka et al., 2024). Although research interest in transformational leadership has increased considerably over the past five years (Iqbal et al., 2020; Sunaryo et al., 2023), limited attention has been given to understanding the internal factors that foster its development among vocational pre-service teachers. Consequently, identifying these antecedents has become an important step toward improving teaching quality in vocational education.

The development of transformational leadership is influenced not only by professional training but also by teachers' internal values and motivational dispositions. Social learning theory suggests that leadership behaviors are acquired through observation, interaction, and the internalization of values within social and educational environments (Bandura, 1989). In the Indonesian educational context, Tamansiswa teaching values (TTV) represent an indigenous educational philosophy emphasizing exemplary conduct, humanistic education, and moral responsibility (Natalia, 2021). These values encourage teachers to become role models who guide, support, and empower students while fostering ethical and socially responsible teaching practices (Kholifah et al., 2025; Nartani et al., 2020; Rabiman et al., 2022; Ratnawati et al., 2019). Accordingly, Tamansiswa teaching values provide an ethical foundation for the development of transformational leadership among vocational pre-service teachers.

Teacher motivation constitutes another essential antecedent of transformational leadership because it provides the psychological energy required to sustain professional growth and instructional improvement. Motivation, reflected through intrinsic drive, task commitment, persistence, self-efficacy, and goal orientation, encourages teachers to continuously improve their competencies and instructional practices (Rabiman et al., 2022). Previous studies have shown that highly motivated teachers are more willing to adopt innovative teaching strategies, embrace professional challenges, and engage in continuous learning (Beardsley et al., 2021; Nartani et al., 2020). Likewise, teachers who internalize local educational values demonstrate stronger ethical commitment, greater adaptability, and higher sensitivity to students' learning needs (Handoyono et al., 2020; Hosen et al., 2021; Natalia, 2021). Together, these findings indicate that Tamansiswa teaching values and motivation constitute important antecedents of transformational leadership.

Beyond its antecedents, transformational leadership is expected to contribute directly to teaching quality. Human capital theory and the theory of planned behavior explain that teaching quality develops through the interaction of knowledge, skills, professional values, attitudes, and behavioral intentions that shape effective instructional practices (Dewey, 2001; Kholifah et al., 2025; Prosser & Quigley, 1949). Teaching quality is reflected in teachers' ability to master subject content, apply effective pedagogical strategies, manage classrooms, engage students, and facilitate meaningful learning experiences (Mahfud et al., 2020). Within this perspective, Tamansiswa teaching values provide ethical guidance, motivation sustains teachers' professional commitment, and transformational leadership translates these internal capacities into innovative and student-centered instructional practices (Ghavifekr & Ramzy, 2020; Nasri et al., 2020; Natalia, 2021; Puruwita et al., 2022; Rabiman et al., 2022). Therefore, these three constructs are expected to contribute positively to teaching quality among vocational pre-service teachers.

Although Tamansiswa teaching values and motivation may directly influence teaching quality, their effects are unlikely to occur independently of teachers' leadership capacity. Teachers with strong ethical values and high motivation may not necessarily demonstrate excellent instructional performance unless these internal resources are translated into observable leadership behaviors. In this regard, transformational leadership serves as a mediating mechanism that converts teachers' values and motivational dispositions into effective instructional practices (Benlahcene et al., 2020; Nartani et al., 2020). Through inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence, transformational leadership enables teachers to transform personal beliefs and motivation into professional actions that improve teaching quality. This mediating perspective provides a more comprehensive explanation of how internal teacher characteristics influence instructional effectiveness in vocational education.

Despite growing interest in transformational leadership, several important research gaps remain. First, previous studies have predominantly examined transformational leadership as an independent predictor of teaching quality, while limited attention has been given to its role as a

mediating mechanism linking teachers' values and motivation with instructional performance. Second, empirical studies integrating indigenous educational philosophies, particularly Tamansiswa teaching values, into transformational leadership research remain scarce, especially within vocational teacher education. Third, most previous studies have examined cultural values, motivation, and leadership separately rather than within an integrated explanatory framework. Consequently, a more comprehensive model is needed to explain how culturally grounded values and psychological readiness jointly contribute to teaching quality through transformational leadership.

To address these gaps, this study aims to develop an evidence-based explanation of how Tamansiswa teaching values and teacher motivation influence the teaching quality of vocational pre-service teachers, both directly and indirectly through the mediating role of transformational leadership. Unlike previous studies that primarily position transformational leadership as an independent predictor, this study conceptualizes transformational leadership as a translational mechanism that converts culturally grounded values and psychological readiness into observable instructional competence. By integrating indigenous Tamansiswa educational philosophy with transformational leadership and motivational perspectives, this study extends existing teacher development models beyond conventional competency-based approaches. The findings are expected to contribute theoretically by clarifying the mediating relationships among values, motivation, leadership, and teaching quality, while also providing practical implications for designing culturally responsive and leadership-oriented vocational teacher education programs.

Based on the theoretical arguments presented above, this study hypothesizes that Tamansiswa teaching values (H1) and motivation (H2) positively influence transformational leadership. Tamansiswa teaching values (H3) and motivation (H4) are also expected to positively influence teaching quality, while transformational leadership (H5) is hypothesized to positively influence teaching quality. Furthermore, transformational leadership is proposed to mediate the relationships between Tamansiswa teaching values and teaching quality (H6) and between motivation and teaching quality (H7).

METHOD

This study employed a quantitative design using Structural Equation Modeling (SEM) to examine the relationships among Tamansiswa teaching values, motivation, transformational leadership, and teaching quality, as SEM enables the testing of complex models and the estimation of direct and indirect effects with high statistical precision. An *ex post facto* approach was used because the variables could not be manipulated, allowing the analysis of naturally occurring differences while maintaining ecological validity (Cohen et al., 2007). To strengthen causal interpretation, a longitudinal design captured data across multiple time points, enhancing insights into temporal stability and developmental changes among pre-service vocational teachers (Kusi et al., 2021). The integration of a quantitative SEM framework, *ex post facto* methodology, and longitudinal perspective provides a rigorous foundation for testing the conceptual model and generating robust, evidence-based implications (Hair Jr. et al., 2017). On the other hand, a longitudinal design is appropriate because the internalization of values, motivation, and transformational leadership is a gradual developmental process. Time-separated measurement strengthens temporal ordering and causal interpretation, ensuring that leadership operates as a mediating mechanism rather than a static association (Omar & Tajudeen, 2020).

The respondents of this study were pre-service vocational teachers enrolled in various teacher education programs across Yogyakarta, Indonesia. From 782 individuals invited, 697 valid responses were retained after removing 85 incomplete or inconsistent entries to ensure data reliability and accurate population representation. All participants were honorary vocational teachers who had not yet obtained professional certification, enabling the study to capture the authentic experiences of individuals who were simultaneously engaged in classroom teaching while preparing for full professional status. This criterion ensured that the investigation into Tamansiswa's teaching values, motivation, and transformational leadership took place in a practical, contextually relevant setting. The final sample comprised 337 males (48.3%) and 360 females (51.7%), reflecting balanced gender representation and increased female participation in vocational teacher education. Teaching

experience was categorized into 1-2 years (268; 38.5%), 3-4 years (182; 26.1%), 5-6 years (143; 20.5%), and more than 6 years (104; 14.9%). The dominance of respondents with 1-2 years of experience indicates that many were still in the early phases of practical teaching engagement, a stage critical for examining how foundational values, motivation, and emerging leadership skills develop. These demographic features strengthen the contextual relevance of the findings and support the study's aim of identifying strategies to enhance the quality of vocational teaching.

The data for this study were collected through a structured survey administered to pre-service vocational teachers across teacher education institutions in Yogyakarta, Indonesia, using both printed and electronic formats to accommodate respondents' varied schedules while balancing coursework and honorary teaching duties. The data collection was conducted using time-separated measurements over a six-week period, allowing respondents to report on values, motivation, leadership behaviors, and teaching quality at different stages of their ongoing teaching engagement rather than at a single point in time. Before distribution, the instrument was reviewed by three experts in vocational education and educational psychology to ensure content validity. This was followed by a pilot test with 40 pre-service teachers, which confirmed clarity, readability, and internal consistency and led to minor revisions.

Participation was voluntary, anonymous, and ethically safeguarded. Respondents could review their answers before submission, ensuring confidentiality throughout the process. The questionnaire comprised four primary constructs: Tamansiswa Teaching Values (TTV), Motivation (Mo), Transformational Leadership (TL), and Teaching Quality (TQ). TTV included seven indicators reflecting Tamansiswa principles such as leadership by example, holistic character development, and community-based educational responsibility (Kholifah et al., 2025; Natalia, 2021). Motivation was assessed through five indicators: intrinsic drive, perseverance, goal orientation, self-efficacy, and commitment to professional growth (Mahfud et al., 2020). TL consisted of six indicators capturing inspirational motivation, individualized consideration, intellectual stimulation, idealized influence, shared vision, and proactive mentoring (Berkovich & Hassan, 2025). TQ was measured through five indicators: lesson planning, instructional delivery, classroom management, student engagement, and assessment practices (Hettinger et al., 2021; Kholifah et al., 2023). All items were measured using a five-point Likert scale (1–5). The six-week data collection period yielded 697 valid responses after removing incomplete or inconsistent entries, ensuring the reliability and representativeness of the data for examining the relationships among TTV, Mo, TL, and TQ.

Data analysis was conducted using SEM to examine the interrelationships among Tamansiswa teaching values, motivation, transformational leadership, and teaching quality, as SEM allows simultaneous assessment of multiple latent constructs and their interdependencies (Westland, 2019). Preliminary screening confirmed the suitability of the data through descriptive statistics, acceptable skewness–kurtosis values, and low multicollinearity, as indicated by VIF scores below 5. The analysis followed a two-step approach, beginning with the measurement model, which demonstrated strong reliability and validity through factor loadings ≥ 0.70 , Cronbach's alpha and composite reliability ≥ 0.70 , and AVE ≥ 0.50 , while discriminant validity was confirmed using the Fornell–Larcker criterion and HTMT (Fornell & Larcker, 1981). Subsequently, the structural model was tested using bootstrapping with 5,000 resamples to assess path significance and confidence intervals. Model fit indices, including SRMR < 0.08 , NFI > 0.90 , and an acceptable chi-square value, supported the model's adequacy. The analysis captured both direct and indirect effects, including the mediating role of transformational leadership, providing strong empirical support for the proposed conceptual framework and meaningful implications for vocational teacher education (Hair Jr. et al., 2017).

RESULTS AND DISCUSSION

Results

The Evaluation of the Measurement Model

The measurement model demonstrated satisfactory reliability and convergent validity across all constructs. All outer loadings for Tamansiswa Teaching Values (TTV), Motivation (Mo), Transformational Leadership (TL), and Teaching Quality (TQ) exceeded the recommended threshold

of 0.70, ranging from 0.895 to 0.965. Convergent validity was also established, with AVE values of 0.899 for TTV, 0.863 for Mo, 0.891 for TL, and 0.864 for TQ, all exceeding the recommended threshold of 0.50. Internal consistency reliability was satisfactory, as Cronbach's alpha and rho_a values for all constructs were above 0.70. The reported VIF values ranged from 1.356 to 3.328 and remained below the threshold of 5, indicating no critical collinearity concerns. Overall, these findings confirm satisfactory indicator reliability, internal consistency reliability, and convergent validity, providing an adequate basis for assessing discriminant validity and subsequently evaluating the structural model.

Table 1. Results of the measurement model evaluation

Variables	Constructs	Convergent Validity		Composite Reliability		Inner VIF (<5.000)
		FL ($\lambda > 0.70$)	AVE (> 0.50)	α (> 0.70)	Rho_a (> 0.70)	
Tamansiswa Teaching Values (TTV)	TTV1	0.965				1.661
	TTV2	0.958				1.960
	TTV3	0.960				1.943
	TTV4	0.959	0.899	0.981	0.981	2.169
	TTV5	0.921				1.946
	TTV6	0.951				1.917
	TTV7	0.920				1.920
Motivation (Mo)	Mo1	0.942				3.328
	Mo2	0.931				2.608
	Mo3	0.933	0.863	0.960	0.961	3.001
	Mo4	0.895				2.901
	Mo5	0.942				3.098
Transformational Leadership (TL)	TL1	0.944				1.854
	TL2	0.951				1.485
	TL3	0.939	0.891	0.976	0.976	1.681
	TL4	0.944				1.493
	TL5	0.947				1.356
	TL6	0.941				1.998
Teaching Quality (TQ)	TQ1	0.896				2.732
	TQ2	0.902				1.758
	TQ3	0.950	0.864	0.960	0.960	1.860
	TQ4	0.946				1.772
	TQ5	0.953				2.782

The discriminant validity assessment presented in Table 2 confirms that all constructs satisfied the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT) criterion. The square roots of the AVE values were 0.929 for Motivation (Mo), 0.948 for Tamansiswa Teaching Values (TTV), 0.930 for Teaching Quality (TQ), and 0.944 for Transformational Leadership (TL), each exceeding its corresponding inter-construct correlations. Furthermore, all HTMT values were below the conservative threshold of 0.85, supporting adequate discriminant validity among the constructs. These results indicate that TTV, Mo, TL, and TQ represent empirically distinct constructs and can therefore be retained for subsequent structural model evaluation.

The HTMT ratios, reported in parentheses, were also well below the conservative threshold of 0.85, ranging from 0.291 to 0.448, further substantiating the absence of multicollinearity and excessive overlap between constructs. These results collectively indicate that Motivation, Tamansiswa Teaching Values, Teaching Quality, and Transformational Leadership are empirically distinct factors within the proposed model, ensuring that subsequent structural analyses are not compromised by measurement redundancy and that each construct captures a unique conceptual domain in explaining teaching quality among vocational pre-service teachers.

Table 2. Discriminant validity analysis on Fornell–Larcker Criterion and HTMT

Variables	Mo (HTMT)	TTV (HTMT)	TQ (HTMT)	TL
Motivation (Mo)	0.929			
Tamansiswa Teaching Values (TTV)	0.948 (0.329)	0.857		
Teaching Quality (TQ)	0.250 (0.291)	0.292 (0.330)	0.930	
Transformational Leadership (TL)	0.345 (0.409)	0.315 (0.363)	0.364 (0.448)	0.944

Model Fit Evaluation

The model fit evaluation in Table 3 and Figure 1 indicates that the proposed measurement model exhibits strong goodness of fit, with all indices meeting the recommended standards. The SRMR value of 0.056 is below the 0.08 threshold, while d_{ULS} (1.269) and d_G (0.293) fall within acceptable bootstrap limits. The Chi-square statistic (29.613) indicates a parsimonious model, and the NFI value of 0.926 exceeds the 0.90 criterion, confirming that the structural model accurately represents the observed data.

The final model illustrates significant relationships among Tamansiswa Teaching Values (TTV), Motivation (Mo), Transformational Leadership (TL), and Teaching Quality (TQ). TTV positively predicts TL ($\beta = 0.287$) and TQ ($\beta = 0.088$), while motivation positively predicts TL ($\beta = 0.399$) and shows the strongest direct effect on TQ ($\beta = 0.880$). TL also positively contributes to TQ ($\beta = 0.238$), supporting its role in explaining teaching quality. Overall, these structural relationships indicate that Tamansiswa teaching values and motivation contribute to teaching quality both directly and through transformational leadership.

Table 3. Result and Model Fit

Goodness of Fit Indices	Saturated Model	Estimated Model	Desired Level	Evaluation
SRMR	0.068	0.056	<0.08	Model fit good
d_{ULS}	0.867	1.269	<max of bootstrap	Model fit good
d_G	0.281	0.293	<max of bootstrap	Model fit good
Chi-square	38.468	29.613	Expected to be small	Model fit good
NFI	0.919	0.926	>0.90	Model fit good

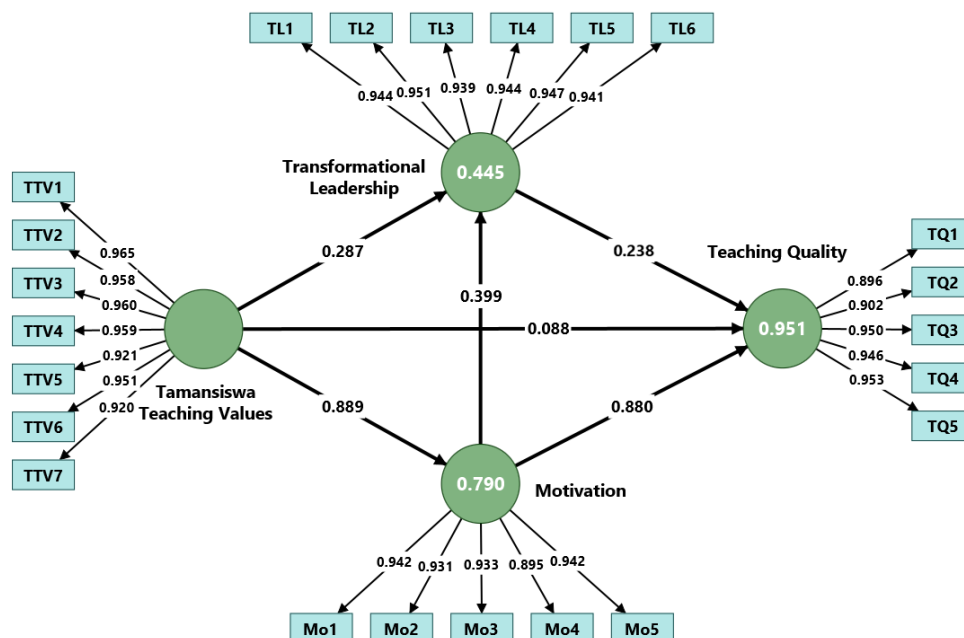


Figure 1. Final Model Measurement

Direct Effect Test

The structural path analysis presented in Table 4 and Figure 2 demonstrates significant direct relationships among Tamansiswa Teaching Values (TTV), Motivation (Mo), Transformational Leadership (TL), and Teaching Quality (TQ). All hypothesized links were statistically supported, with p-values well below the 0.05 threshold, indicating robust predictive power within the model. TTV exerts a positive effect on TL ($\beta = 0.287$, $t = 5.137$, $p = 0.001$) and directly contributes to TQ ($\beta = 0.088$, $t = 3.862$, $p = 0.029$), suggesting that the internalization of Tamansiswa values strengthens leadership capacity and instructional quality.

Motivation shows the strongest influence, significantly predicting TL ($\beta = 0.399$, $t = 7.563$, $p < 0.001$) and TQ ($\beta = 0.880$, $t = 10.983$, $p < 0.001$), highlighting the essential role of individual drive in shaping leadership behaviors and teaching outcomes. In addition, TL significantly enhances TQ ($\beta = 0.238$, $t = 6.201$, $p = 0.002$), confirming its importance as a key mechanism for elevating pre-service teachers' instructional quality. These results collectively underscore the complementary roles of values-based education and motivational factors in fostering transformational leadership, which, in turn, serves as a critical conduit for improving teaching quality in vocational pre-service teacher contexts.

Table 4. Direct Effect Test

Hypothesis	Path	β -value	STDEV	t-statistics	p-value	Evaluation
H1a	TTV $\rightarrow$ TL	0.287	0.045	5.137	0.001	Supported
H1b	Mo $\rightarrow$ TL	0.399	0.041	7.563	0.000	Supported
H2a	TTV $\rightarrow$ TQ	0.088	0.042	3.862	0.029	Supported
H2b	Mo $\rightarrow$ TQ	0.880	0.039	10.983	0.000	Supported
H2c	TL $\rightarrow$ TQ	0.238	0.038	6.201	0.002	Supported

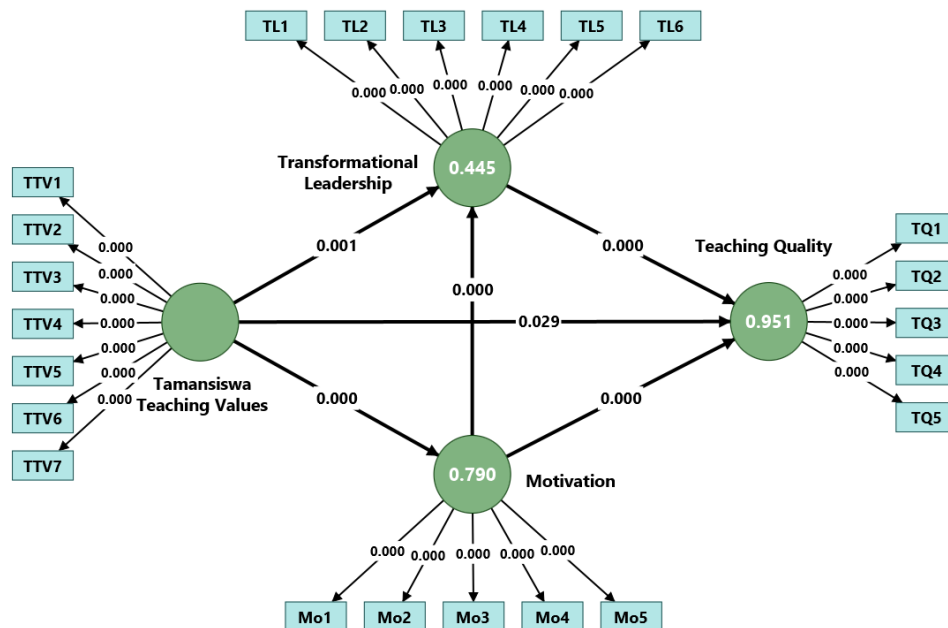


Figure 2. Direct Effect Test

Indirect Effect Test

The mediation analysis summarized in Table 5 reveals significant indirect pathways that clarify the mechanisms linking Tamansiswa Teaching Values (TTV) and Motivation (Mo) to Teaching Quality (TQ) through Transformational Leadership (TL). Both hypothesized mediations are fully supported, demonstrating the pivotal role of TL in strengthening the impact of foundational values and motivation on instructional outcomes. Specifically, TTV exerts a significant indirect influence on TQ via TL ($\beta = 0.090$, $p = 0.033$), with a total effect of $\beta = 0.112$ ($p < 0.001$), suggesting

that the internalization of Tamansiswa values enhances teaching quality primarily when teachers exhibit transformational leadership behaviors.

Similarly, Mo displays a robust indirect effect on TQ through TL ($\beta = 0.146$, $p < 0.001$), with a total effect of $\beta = 0.186$ ($p < 0.001$), indicating that motivational drive strengthens teaching performance both directly and by fostering leadership competencies. These findings emphasize that transformational leadership functions as a crucial mediating mechanism, translating personal values and motivation into higher levels of teaching quality among vocational pre-service teachers. The results highlight the strategic importance of leadership development as an intermediary process for leveraging internal factors to achieve superior instructional outcomes.

Table 5. Indirect Effect Test Result

Hypothesis	Path	Direct Effect		Indirect Effect		Total Effect		Evaluation
		β -value	p	β -value	p	β -value	p	
H2c	TL $\rightarrow$ TQ	0.238	0.002	-	-	0.238	0.002	-
H2a	TTV $\rightarrow$ TL	0.088	0.029	-	-	0.088	0.029	-
H3a	TTV $\rightarrow$ TL $\rightarrow$ TQ	0.090	0.033	0.022	0.037	0.112	0.000	Supported
H2b	Mo $\rightarrow$ TQ	0.880	0.000	-	-	0.880	0.000	-
H3b	Mo $\rightarrow$ TL $\rightarrow$ TQ	0.146	0.000	0.040	0.000	0.186	0.000	Supported

Discussion

The present study reveals a coherent pattern in which cultural values, personal motivation, and leadership dynamics jointly shape the instructional quality of vocational pre-service teachers. Tamansiswa's teaching values emerge as a foundational driver, instilling moral discipline, social responsibility, and a spirit of service in future educators. These values appear to inspire proactive professional behaviors by nurturing ethical sensitivity and commitment to community welfare, which in turn enhances confidence and willingness to embrace challenging teaching tasks (Kholifah et al., 2025; Natalia, 2021). Motivation strengthens this process by supplying the energy and perseverance required to translate ideals into daily practice (Mahfud et al., 2020).

The interaction of these two forces generates a fertile environment for transformational leadership to flourish. When pre-service teachers internalize shared values and sustain high motivation, they naturally develop the vision, intellectual openness, and individualized concern that characterize transformational leaders (Febriantina et al., 2021; Nurtanto et al., 2021). These qualities then manifest in richer lesson planning, more adaptive classroom strategies, and higher engagement with students, culminating in measurable improvements in teaching quality (Ghavifekr & Ramzy, 2020; Rafiola et al., 2020).

While the data strongly support these linkages, the findings also invite critical reflection. One point of debate lies in the cultural specificity of Tamansiswa values. Supporters will view the successful incorporation of local philosophical principles into a modern teacher education framework as a breakthrough that validates indigenous knowledge systems (Dewey, 2001; Lin et al., 2017). Skeptics, however, may question whether these values can maintain their transformative power when applied to diverse educational settings or when vocational schools face pressure to conform to global standards.

Another contentious issue concerns the timing of leadership development. Some may argue that pre-service teachers, who lack formal authority and classroom autonomy, have limited opportunity to exercise transformational influence, raising doubts about the depth of leadership that can be cultivated before full professional entry (Rahman et al., 2020; Tütlys & Spöttl, 2022). These counterarguments underscore the need for nuanced approaches that balance local heritage with universal competencies and that provide authentic leadership experiences during training.

Beyond these debates, this research contributes a novel extension to existing structural models by embedding indigenous values within a leadership-mediated framework and testing it in a population of vocational pre-service teachers. Previous studies have examined similar relationships among organizational employees or certified teachers, but rarely have they integrated a cultural value system as a central predictor of leadership and teaching quality (Natalia, 2021; Noor et al., 2021). By adapting this model to a border-region context where teacher professionalization is uneven and socio-

cultural dynamics are complex, the study demonstrates that culturally grounded values and motivational drives can be systematically channeled into higher instructional performance through transformational leadership (Haniah et al., 2020; Yangari & Inga, 2021). This insight opens new strategic possibilities for teacher education in vocational schools: programs can intentionally combine value internalization, motivational enhancement, and leadership training to accelerate professional growth. For border or peripheral regions that often struggle to attract and retain quality educators, these findings highlight a culturally resonant pathway to boost teacher competence without relying solely on material incentives or standardized curricula (Wagiran et al., 2022).

Despite these promising contributions, the study has limitations that must be acknowledged. The reliance on self-reported survey data introduces the risk of social desirability bias, and the single regional sample restricts the generalizability of the results to other cultural or institutional settings. Furthermore, the cross-sectional design, although strengthened by a longitudinal element in data collection, cannot fully capture the developmental trajectory of value internalization, motivational change, and leadership emergence over time. Future research should address these concerns by employing multi-source data, incorporating classroom observations, and conducting follow-up studies across different regions and educational systems. Comparative analyses between vocational and general teacher education programs would also clarify whether the observed mechanisms are unique to the vocational context or represent broader principles of teacher development.

The theoretical and practical implications are equally significant. Theoretically, the study affirms that transformational leadership in teacher education is not a standalone construct but one that thrives on integrating cultural values and motivational resources. Practically, teacher training institutions and policymakers should design curricula that embed Tamansiswa principles, provide structured motivational support, and create authentic opportunities for leadership practice during pre-service preparation. Such integrated programs can produce vocational teachers who are not only technically competent but also morally grounded and capable of inspiring students in diverse classroom environments. By refining models of teacher development to include cultural value systems, motivation, and leadership, future initiatives can foster a new generation of educators who combine ethical character with professional excellence, thereby advancing the quality and relevance of vocational education.

CONCLUSION

This study demonstrates that Tamansiswa teaching values and personal motivation are significant antecedents of teaching quality among vocational pre-service teachers, both directly and through the mediating role of transformational leadership. Empirically, motivation emerges as the strongest predictor of teaching quality ($\beta = 0.880$), followed by transformational leadership ($\beta = 0.238$), while Tamansiswa teaching values show a smaller yet significant direct effect ($\beta = 0.088$). In addition, Tamansiswa teaching values ($\beta = 0.287$) and motivation ($\beta = 0.399$) significantly enhance transformational leadership, which in turn mediates their effects on teaching quality, with indirect effects of $\beta = 0.090$ and $\beta = 0.146$, respectively. These findings confirm that transformational leadership serves as a critical mechanism for translating culturally grounded values and motivational resources into effective instructional practices. By integrating an indigenous philosophical framework within a leadership-mediated structural model, this study extends conventional competency-based approaches to teacher development and provides empirical evidence for the strategic role of value internalization and leadership formation in vocational teacher education. Practically, the results suggest that pre-service teacher preparation programs should systematically integrate Tamansiswa-based value education, motivational strengthening, and transformational leadership development to produce vocational teachers who are not only pedagogically competent but also ethically grounded and capable of inspiring high-quality learning.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial or non-financial interests that could have appeared to influence the work reported in this paper.

REFERENCES

- Ade-Ojo, G. O., Markowski, M., Essex, R., Stiell, M., & Jameson, J. (2022). A systematic scoping review and textual narrative synthesis of physical and mixed-reality simulation in pre-service teacher training. *Journal of Computer Assisted Learning*, 38(3), 861–874. <https://doi.org/10.1111/jcal.12653>
- Al Halbusi, H., Williams, K. A., Ramayah, T., Aldieri, L., & Vinci, C. P. (2021). Linking ethical leadership and ethical climate to employees' ethical behavior: The moderating role of person–organization fit. *Personnel Review*, 50(1), 159–185. <https://doi.org/10.1108/PR-09-2019-0522>
- Alayda, F. I., Sudira, P., & Mutohhari, F. (2022). Competency of vocational education teachers in the society era 5.0. *Jurnal Pendidikan Dan Pengajaran*, 55(3), 587–598. <https://doi.org/10.23887/jpp.v55i3.46812>
- Aziah Ismail, Nor Shafrin Ahmad, Fadzilah Amzah, & Rahimi Che Aman. (2021). Female transformational leadership and teachers' commitment: Mediating effect of perceived organisational politics. *International Journal of Business and Society*, 22(2), 591–606. <https://doi.org/10.33736/ijbs.3741.2021>
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44(9), 1175–1184. <https://doi.org/10.1037/0003-066X.44.9.1175>
- Beardsley, M., Albó, L., Aragón, P., & Hernández-Leo, D. (2021). Emergency education effects on teacher abilities and motivation to use digital technologies. *British Journal of Educational Technology*, 52(4), 1455–1477. <https://doi.org/10.1111/bjet.13101>
- Benlahcene, A., Awang-Hashim, R., & Kaur, A. (2020). Personal best goals: Do they mediate the relationship between teacher autonomy support and student engagement? *Malaysian Journal of Learning and Instruction*, 17(1), 25–49. <https://eric.ed.gov/?id=EJ1248970>
- Berkovich, I., & Hassan, T. (2025). Principals' digital transformational leadership, teachers' commitment, and school effectiveness. *Education Inquiry*, 16(2), 177–194. <https://doi.org/10.1080/20004508.2023.2173705>

- Billett, S. (2011). *Vocational education*. Springer Netherlands. <https://doi.org/10.1007/978-94-007-1954-5>
- Clarke, L., & Winch, C. (2012). *Vocational education*. Routledge. <https://api.taylorfrancis.com/content/books/mono/download?identifierName=doi&identifierValue=10.4324/NOE0415380607&type=googlepdf>
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education: Routledge Taylor & Francis Group*.
- Dewey, J. (2001). Democracy and education, the Pennsylvania State University. *Pennsylvania State*.
- Dreer-Goethe, B. (2023). Well-being and mentoring in pre-service teacher education: An integrative literature review. *International Journal of Mentoring and Coaching in Education*, 12(4), 336–349. <https://doi.org/10.1108/IJMCE-09-2022-0073>
- Febriantina, S., Karyaningsih, P. D., Victorynie, I., Faslah, R., & Ramadhini, N. (2021). Impact of school principals' transformational leadership and teacher's organizational commitment on their citizenship behaviour. *MOJEM: Malaysian Online Journal of Educational Management*, 9(2), 18–28. <https://sare.um.edu.my/index.php/MOJEM/article/view/29356>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Ghavifekr, S., & Ramzy, M. I. (2020). Exploring effective leadership practices of private school principals to improve teachers' academic excellence and students' learning achievement. *Journal of Research in Education Sciences*, 65(3). <https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=2073753X&AN=146664181&h=f%2BtueSB84iiUcTNQDWC8yq45xyYp7o4F%2FYxR7YZNWM%2FHKIgVibYFSwUR6hmgKfxE0wKYviM%2FzNNIIMUP6pu5qA%3D%3D&crl=c>
- Goodwin, A. L., & Kosnik, C. (2013). Quality teacher educators = quality teachers? Conceptualizing essential domains of knowledge for those who teach teachers. *Teacher Development*, 17(3), 334–346. <https://doi.org/10.1080/13664530.2013.813766>
- Hair Jr., J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, 1(2), 107–123. <https://doi.org/10.1504/IJMDA.2017.087624>
- Handoyono, N. A., Suparmin, S., Samidjo, S., Johan, A. B., & Suyitno, S. (2020). Project-based learning model with real object in vocational school learning. *Journal of Physics: Conference Series*, 1700(1), 012045. <https://doi.org/10.1088/1742-6596/1700/1/012045>
- Haniah, A. R., Aman, A., & Setiawan, R. (2020). Integration of strengthening of character education and higher order thinking skills in history learning. *Journal of Education and Learning (EduLearn)*, 14(2), 183–190. <https://doi.org/10.11591/edulearn.v14i2.15010>
- Hosen, M., Ogbeibu, S., Giridharan, B., Cham, T.-H., Lim, W. M., & Paul, J. (2021). Individual motivation and social media influence on student knowledge sharing and learning performance: Evidence from an emerging economy. *Computers & Education*, 172, 104262. <https://doi.org/10.1016/j.compedu.2021.104262>
- Iqbal, Q., Ahmad, N. H., & Halim, H. A. (2020). How does sustainable leadership influence sustainable performance? Empirical evidence from selected ASEAN countries. *Sage Open*, 10(4), 2158244020969394. <https://doi.org/10.1177/2158244020969394>
- Jais, I. R. M., Yahaya, N., & Ghani, E. K. (2020). Higher education leadership competency framework in Malaysia: A refinement. *Humanities and Social Sciences Letters*, 8(4), 438–449. <https://doi.org/10.18488/journal.73.2020.84.438.449>

- Jan, G., Zainal, S. R. M., & Lata, L. (2021). Enhancing innovative work behaviour: The role of servant leadership and creative self-efficacy. *On the Horizon: The International Journal of Learning Futures*, 29(2), 33–51. <https://doi.org/10.1108/OTH-12-2020-0044>
- Johari, A., Abdul Wahat, N. W., & Zaremohzzabieh, Z. (2021). Innovative work behavior among teachers in Malaysia: The effects of teamwork, principal support, and humor. *Asian Journal of University Education*, 17(2), 72. <https://doi.org/10.24191/ajue.v17i2.13387>
- Kholifah, N., Kurdi, M. S., Nurtanto, M., Mutohhari, F., Fawaid, M., & Subramaniam, T. S. (2023). The role of teacher self-efficacy on the instructional quality in 21st century: A study on vocational teachers, Indonesia. *International Journal of Evaluation and Research in Education (IJERE)*, 12(2), 998. <https://doi.org/10.11591/ijere.v12i2.23949>
- Kholifah, N., Nurtanto, M., Mutohhari, F., Triyanto, Saputro, I. N., & Masek, A. (2025). Realization of profil pelajar pancasila based on project learning in vocational education at Tamansiswa, Indonesia. *Qualitative Research in Education*, 14(2), 133–155. <https://doi.org/10.17583/qre.12554>
- Khuzainei, I., Zulkifli, M. N., Mohamad, S. R., & Chau Leong, P. (2020). Technical competency among vocational teachers in Malaysian public skills training institutions: Measurement model validation using PLS-SEM. *Journal of Technical Education and Training*, 12(1). <https://doi.org/10.30880/jtet.2020.12.01.017>
- Kurniawan, R., Jaedun, A., Mutohhari, F., & Kusuma, W. M. (2021). The absorption of vocational education graduates in the automotive sector in the industrial world. *Journal of Education Technology*, 5(3), 482–490. <https://doi.org/10.23887/jet.v5i3.35365>
- Kusi, M., Zhao, F., & Sukamani, D. (2021). Impact of perceived organizational support and green transformational leadership on sustainable organizational performance: A SEM approach. *Business Process Management Journal*, 27(5), 1373–1390. <https://doi.org/10.1108/BPMJ-09-2020-0419>
- Li, L., & Liu, Y. (2022). An integrated model of principal transformational leadership and teacher leadership that is related to teacher self-efficacy and student academic performance. *Asia Pacific Journal of Education*, 42(4), 661–678. <https://doi.org/10.1080/02188791.2020.1806036>
- Lin, M.-H., Chen, H.-C., & Liu, K.-S. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(7), 3553–3564. <https://doi.org/10.12973/eurasia.2017.00744a>
- Mahfud, T., Siswanto, I., Wijayanto, D. S., & Puspitasari, P. F. (2020). Antecedent factors of vocational high school students' readiness for selecting careers: A case in Indonesia. *Jurnal Cakrawala Pendidikan*, 39(3), 633–644. <https://doi.org/10.21831/cp.v39i3.32310>
- Mutohhari, F., Sutiman, S., Nurtanto, M., Kholifah, N., & Samsudin, A. (2021). Difficulties in implementing 21st century skills competence in vocational education learning. *International Journal of Evaluation and Research in Education (IJERE)*, 10(4), 1229. <https://doi.org/10.11591/ijere.v10i4.22028>
- Nartani, C. I., Wardani, K., & Praheto, B. E. (2020). The internalization of tri-n tamansiswa teaching principle in primary school teacher education department. *Journal of Educational Sciences*, 4(3), 575. <https://doi.org/10.31258/jes.4.3.p.575-583>
- Nasri, N. M., Halim, L., & Abd Talib, M. A. (2020). Self-directed learning curriculum: Students' perspectives of university learning experiences. *Malaysian Journal of Learning and Instruction*, 17(2), 227–251. <https://eric.ed.gov/?id=EJ1272012>
- Natalia, B. E. F. (2021). Philosophical basis on education principle of tamansiswa in the beginning of its establishment. *Academy of Education Journal*, 12(1), 15–21. <https://doi.org/10.47200/aoej.v12i1.412>

- Noor, A. F., Sonedi, D., Azman, M. N. A., Khunaifi, A. R., Dwiningrum, S. I. A., & Haryanto, D. (2021). The multicultural education paradigm pattern: A case study in Muhammadiyah Junior High School in Palangka Raya, Indonesia. *Perspectives of Science and Education*, 52(4), 297–310. <https://doi.org/10.32744/pse.2021.4.19>
- Nota, L., Soresi, S., Ferrari, L., & Ginevra, M. C. (2014). Vocational designing and career counseling in Europe. *European Psychologist*, 19(4), 248–259. <https://doi.org/10.1027/1016-9040/a000189>
- Nur, H. R., Arifin, Z., Soeryanto, Mutohhari, F., & Daryono, R. W. (2023). Society 5.0 competency: Readiness level of teachers and students in automotive engineering vocational school. *AIP Conference Proceedings*, 060009. <https://doi.org/10.1063/5.0114613>
- Nurtanto, M., Kholifah, N., Masek, A., Sudira, P., & Samsudin, A. (2021). Crucial problems in arranged the lesson plan of vocational teacher. *International Journal of Evaluation and Research in Education (IJERE)*, 10(1), 345. <https://doi.org/10.11591/ijere.v10i1.20604>
- Nurtanto, M., Sudira, P., Sofyan, H., Kholifah, N., & Triyanto, T. (2022). Professional identity of vocational teachers in the 21st century in Indonesia. *Journal of Engineering Education Transformations*, 35(3), 30–36. <https://doi.org/10.16920/jeet/2022/v35i3/22085>
- Ogbuanya, T. C., & Shodipe, T. O. (2022). Workplace learning for pre-service teachers' practice and quality teaching and learning in technical vocational education and training: Key to professional development. *Journal of Workplace Learning*, 34(4), 327–351. <https://doi.org/10.1108/JWL-02-2021-0015>
- Omar, S., & Tajudeen, F. P. (2020). The influence of career adaptability and career commitment to minimize intention to leave among ICT professionals. *International Journal of Human Capital and Information Technology Professionals*, 11(2), 23–38. <https://doi.org/10.4018/IJHCITP.2020040102>
- Prosser, C. A., & Quigley, T. H. (1949). *Vocational education in a democracy*. American Technical Society.
- Puruwita, D., Jamian, L. S., & Abdul Aziz, N. (2022). Instructional Leadership Practices and Teachers' Job Performance at High-Performing Vocational Schools in Indonesia: A Conceptual Framework. *Asian Journal of University Education*, 18(3), 585–596. <https://doi.org/10.24191/ajue.v18i3.18946>
- Rabiman, R., Ratnawati, D., & Karyaningsih, E. W. (2022). Difficulties in implementing “Ki Hadjar Dewantara's Tamansiswa teachings” on vocational education. *Jurnal Kependidikan Penelitian Inovasi Pembelajaran*, 6(1), 80–92. <https://doi.org/10.21831/jk.v6i1.45166>
- Rafiola, R. H., Setyosari, P., Radjah, C. L., & Ramli, M. (2020). The effect of learning motivation, self-efficacy, and blended learning on students' achievement in the industrial revolution 4.0. *International Journal of Emerging Technologies in Learning (IJET)*, 15(8), 71–82. <https://doi.org/10.3991/ijet.v15i08.12525>
- Rahman, A. B. W. A., Hussain, M. A. M., & Zulkifli, R. M. (2020). Teaching vocational with technology: A study of teaching aids applied in Malaysian vocational classroom. *International Journal of Learning, Teaching and Educational Research*, 19(7), 176–188. <https://doi.org/10.26803/ijlter.19.7.10>
- Ratnawati, D., Hadi, S., Setuju, S., Setiyadi, B. R., Purnomo, S., & Handoyono, N. A. (2019). Retooling practice learning model based on project based learning integrated to Tamansiswa studies at university. *International Journal of Recent Technology and Engineering*, 8, 754–758. <https://www.ijrte.org/wp-content/uploads/papers/v8i1C2/A11270581C219.pdf>
- Rodzalan, S. A., Mohd Noor, N. N., Abdullah, N. H., & Mohamed Saat, M. (2022). TVET skills gap analysis in electrical and electronic industry: perspectives from academicians and industry

- players. *Journal of Technical Education and Training*, 14(1), 158–177. <https://doi.org/10.30880/jtet.2022.14.01.014>
- Sliwka, A., Klopsch, B., Beigel, J., & Tung, L. (2024). Transformational leadership for deeper learning: Shaping innovative school practices for enhanced learning. *Journal of Educational Administration*, 62(1), 103–121. <https://doi.org/10.1108/JEA-03-2023-0049>
- Sunaryo, W., Yusnita, N., Herfina, H., Wulandari, D., & Suhendra, S. (2023). The effects of digital transformational leadership, work environment and motivation on reinforcing job satisfaction: Evidence from vocational schools. *International Journal of Data and Network Science*, 7(2), 883–890. <https://doi.org/10.5267/j.ijdns.2022.12.023>
- Susanto, R., Rozali, Y. A., & Agustina, N. (2019). Development of pedagogical competency models for elementary school teachers: Pedagogical knowledge, reflective ability, emotional intelligence and instructional communication pattern. *Universal Journal of Educational Research*, 7(10), 2124–2132. <https://doi.org/10.13189/ujer.2019.071010>
- Sutiman, S., Sofyan, H., Arifin, Z., Nurtanto, M., & Mutohhari, F. (2022). Industry and education practitioners' perceptions regarding the implementation of work-based learning through industrial internship (WBL-II). *International Journal of Information and Education Technology*, 12(10), 1090–1097. <https://doi.org/10.18178/ijiet.2022.12.10.1725>
- Tütlys, V., & Spöttl, G. (2022). Disruption of qualifications in manufacturing: Challenges and prospects. *European Journal of Training and Development*, 46(5/6), 390–412. <https://doi.org/10.1108/EJTD-07-2020-0121>
- Van Katwijk, L., Jansen, E., & Van Veen, K. (2023). Pre-service teacher research: a way to future-proof teachers? *European Journal of Teacher Education*, 46(3), 435–455. <https://doi.org/10.1080/02619768.2021.1928070>
- Wagiran, W., Suharjana, S., Nurtanto, M., & Mutohhari, F. (2022). Determining the e-learning readiness of higher education students: A study during the COVID-19 pandemic. *Heliyon*, 8(10), e11160. <https://doi.org/10.1016/j.heliyon.2022.e11160>
- Westland, J. C. (2019). Full-information covariance SEM. In *Structural Equation Models* (pp. 39–49). Springer, Cham. https://doi.org/10.1007/978-3-030-12508-0_3
- Wibowo, R. A., Myau-Lyau, N., Christy, N. N. A., & Albert, A. (2022). The challenges for Indonesia to integrate dual vocational education and training system. *Journal of Technical Education and Training*, 14(2), 79–90. <https://doi.org/10.30880/jtet.2022.14.02.008>
- Yangari, M., & Inga, E. (2021). Educational innovation in the evaluation processes within the flipped and blended learning models. *Education Sciences*, 11(9), 487. <https://doi.org/10.3390/educsci11090487>
- Yeap, S. B., Abdullah, A. G. K., & Thien, L. M. (2020). Lecturers' commitment to teaching entrepreneurship: do transformational leadership, mindfulness and readiness for change matter? *Journal of Applied Research in Higher Education*, 13(1), 164–179. <https://doi.org/10.1108/JARHE-12-2019-0311>