

Transformational Leadership and Academic Environment in Secondary Schools: A Principal-Perspective Study on the Mediating Role of Teachers' Attitudes in Khyber Pakhtunkhwa, Pakistan

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ABSTRACT: This study explored the relationship between transformational leadership (TL) and academic environment (AE) in government boys' secondary schools of Malakand Division, Khyber Pakhtunkhwa (KP), Pakistan, and identified the mediating role of teachers' attitudes (TA). Data were obtained from 168 principals from five districts using Yamane's (1967) formula with multistage random sampling. Transformational leadership (13 items, $\alpha = .90$), academic environment (17 items, $\alpha = 0.90$), and teachers' attitudes (5 items, $\alpha = 0.77$) were measured by validated Likert-scale questionnaires. SPSS v26 was used for descriptive statistics and Pearson correlations, while Smart-PLS v4 was used for PLS-SEM with 5,000 iteration bootstrapped mediation. Academic environment showed a high positive correlation with transformational leadership ($r = .775$, $p < .01$). The study reveals that teachers' attitudes significantly mediate the academic environment ($\beta = .634$, $t = 8.641$, $p < .001$), contributing an indirect effect ($\beta = .089$, $t = 2.270$, $p = .023$; 95% CI [.012, .168]). The model explains 51.2% of the variance in the academic environment. Principals with M.Phil (Education) qualifications show higher scores in transformational leadership ($M = 57.55$) and academic environment ($M = 80.09$). The results underscore a dual impact of principals' leadership: a direct administrative effect alongside a mediating role of teacher attitudes. Notably, the direct effect is similar across principal and teacher perspectives ($\beta = .634$ vs. $\beta = .632$), while the teacher attitude mediation appears weaker from principals' data. The findings suggest a need for principals' training in management and transformational behaviors, alongside a multi-source feedback evaluation system for school leaders.

KEYWORDS: Transformational Leadership, Academic Environment, Teachers' Attitudes, Principals, Mediation, PLS-SEM, Khyber Pakhtunkhwa, Secondary Schools

Introduction

Educational leadership is known to be one of the most important factors of school effectiveness, teacher performance and student learning outcomes (Amatullah et al., 2025; Zhang & Wu, 2025). Transformational leadership is one of the leadership paradigms that draws continuous research attention since it is proven to inspire followers, create

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commitment and improve school climate (Bass & Riggio, 2006), and Burns (Burns, 1978) originally proposed and Bass operationalized transformational leadership as four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Bass Bernard, 1985). These behaviors help leaders to rise above the mundane administrative activities and inspire followers to perform beyond expectations (Lai et al., 2020; Udin, 2020).

In secondary school settings, the transformational principals clearly describe a compelling school vision, push teachers to innovate, offer personalized professional development and set an example for ethical behavior. These behaviors have been associated with increased teacher job satisfaction, better organizational climate and increased student achievement in a large international literature (Liebowitz & Porter, 2019; Li & Karanxha, 2024). The evidence, however, is not well established and may not be generalizable to low-resource, conflict-affected areas. Khyber Pakhtunkhwa (KP) province of Pakistan is a typical example of this context. Despite having 2,284 secondary schools, serving more than one million students, KP continues to suffer from infrastructure deficits, teacher shortages, poverty and security challenges (Jan & Manzoor, 2021; Ahmed & Kiran, 2024; PIE, 2022). Malakand Division has seen significant sociopolitical turmoil and is therefore a major but relatively unexplored educational leadership research context in KP. Previous studies on transformational leadership in Pakistan have explored its relationship with teachers' motivation (Jan & Manzoor, 2021) and students' achievement (Rehman et al., 2019), while none of them have studied the academic environment as a multi-faceted outcome nor examined the role of teachers' attitudes as a mediator in this provincial context. Teacher attitudes refer to teacher motivation, professional commitment and job satisfaction and are known as strong proximal determinants of classroom practices and school climate (Marian et al., 2025).

Theoretically, it is known that the principals' influence on the academic atmosphere through teachers' attitudes has not been tested in KP secondary schools. The present study aimed to fill this gap by pursuing two objectives: (1) to explore the levels of transformational leadership and academic environment perceived by principals, and (2) to determine the relationship between transformational leadership and academic environment.

Literature Review

Transformational Leadership in Educational Administration

The concept of transformational leadership theory came from the seminal work of Burns (1978), who distinguished between transactional exchanges (contingency rewards and compliance) and the transformational process (driven by higher-order goals and shared purposes). Bass later expanded this framework to the Full-Range Leadership Model which included four major transformational dimensions: idealized influence the extent to which leaders serve as role models for their ethical conduct; inspirational motivation the ability to communicate a vision of the future; intellectual stimulation the ability to stimulate thinking and creative problem solving; and individualized consideration the attention paid to the unique developmental needs of followers (Bass & Bass Bernard, 1985). In school settings, principals who consistently demonstrate these behaviors have been found to foster collaborative, innovative, and supportive conditions at school (Schechter, 2011).

A meta-analysis by Judge and Piccolo revealed strong positive correlations between transformational leadership and various outcomes such as leadership effectiveness, follower satisfaction, and organizational performance (Judge & Piccolo, 2004). Within the field of education, Toprak et al reviewed 37 empirical studies and determined that transformational school leadership has a significant indirect impact on student achievement through increased teacher motivation, a positive school culture, and improved instruction (Toprak et al., 2023). Similar evidence has emerged from South Asian secondary schools, where Dutta and Sahney (2022) documented the beneficial influence of transformational leadership on school processes (Dutta and Sahney, 2022). However, recent studies in Pakistan

support the above trend. Muhammad and Reba reported that principals' transformational behaviors had a positive effect on teacher motivation (Muhammad & Reba, 2023), while studies found that transformational leadership had a significant impact on student achievement in private secondary schools of Pakistan (Shaukat et al., 2023; Mian & Khan, 2025). However, none of these studies have considered the academic environment as a dependent construct, nor have they tested the mediating role of teachers' attitudes, which is addressed directly by the present study.

Academic Environment: Dimensions and Determinants

The term "Academic environment" refers to the diverse physical, social, psychological, and pedagogical settings in which teaching and learning occur (Divaris et al., 2008). Fraser (1985) conceptualized it as comprising four tightly interrelated dimensions (Fraser, 1987). Classroom environment dimension includes the quality of teacher-student interaction, teaching method, student participation and learning resources, which are strengthened by the provision of pedagogical guidance and learning materials by the principal (Lumadi, 2025; Wu & Yu, 2022). The organizational environment dimension reflects the school-level communication pattern, clear goals, policy uniformity, and level of collaborative decision making (Lee, 2013; Pañares, 2025). The disciplinary environment dimension includes rules, expectations, and procedures that govern students' behavior; the ability to discipline fairly, transparently, and consistently is crucial to ensuring that the school environment is safe and orderly, which in turn is essential to student achievement (Yap et al., 2026; Ko et al., 2023). The social environment dimension includes peer relationships, collegial relationships among teachers, and the overall culture of caring and belongingness (Lepore and Capone, 2023). There is strong empirical evidence that positive academic contexts are strong predictors of youth engagement, academic achievement, and psychological health (Gietz & McIntosh, 2014; Thapa et al., 2013). While transformational leadership has emerged as one of the strongest leadership-level antecedents of academic environment quality, the bulk of this evidence derives from Western or East Asian educational systems. The present study contributes to this evidence base in a conflict-affected South Asian context, which is a geographic and contextual gap.

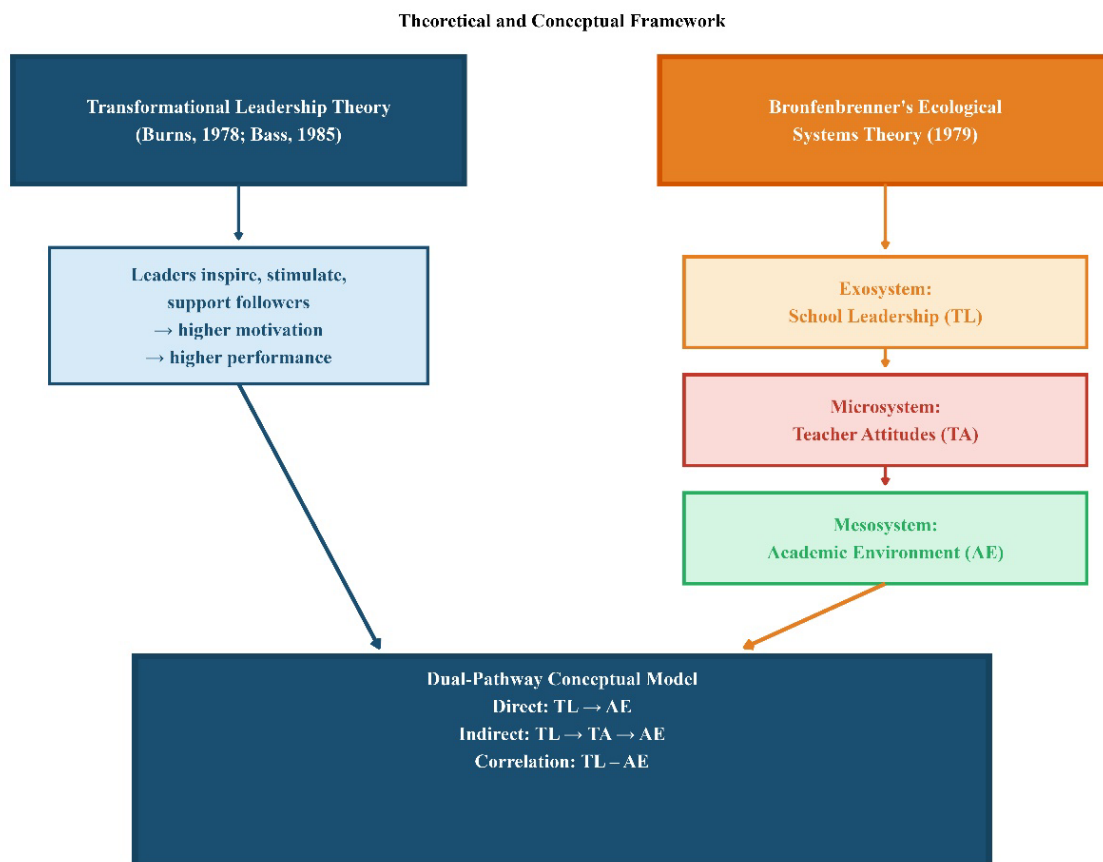
Teachers' Attitudes as Mediator

Teacher attitudes refer to the attitude of teachers towards their profession, students, colleagues and the institution as a whole, which involves affective, cognitive and behavioral aspects (Kagan, 1992). These include intrinsic motivation, organizational commitment, and job satisfaction (Erdoğdu, 2013). Positive attitudes are characterized by positive enthusiasm, professional commitment, and innovation. According to Erdoğdu (2013), teacher attitudes are the second most important factor in the success of the students after the family background. Negative teacher behaviours, including hostile communication or indifference, significantly reduced student engagement (Broeckelman-Post et al., 2016); Darling-Hammond emphasized that the attitudinally positive teacher held high expectations, established trusting relationships and had responsive pedagogical strategies (Darling-Hammond, 2008). Transformational leadership serves to influence teacher attitudes in a twofold manner. First, through their ability to articulate a compelling school vision and to model ethical commitment, principals raise teachers' intrinsic motivations and their sense of professional purpose. Second, the intellectual stimulation and personalized developmental support that principals offer promote professional growth, hence, increase organizational commitment and job satisfaction (Hilal & Suriansyah, 2021; Osorno & Manonag, 2022). Positive teachers, in turn, are more likely to establish positive climates in the classroom, work cooperatively with colleagues, and enforce discipline fairly, which can add to the overall positive academic climate. Although there is conceptual support for this theorized mediation pathway, it has not been empirically tested with the principal-reported data in secondary schools of KP.

Theoretical Framework

In this study, two complementary theoretical approaches are combined. The basic explanation is provided by Transformational Leadership Theories (Burns, 1978; Bass & Bass Bernard, 1985), which suggests that transformational leaders inspire, stimulate, and support followers to change their values and motivations, allowing them to perform above routine expectations (Fig 1). In the school context, transformational principles directly impact the environment of the school, namely the academic environment, and also influence the psychological state, namely the attitude of the teachers. Bronfenbrenner's (1979) ecological systems theory offers a multi-level, structural perspective to complement the leadership framework. It places the school as a multi-level ecosystem, where the leadership (exosystem) has an effect on the attitudes of teachers (microsystem), which in turn affect the academic ecosystem (mesosystem). From this ecological framing, the mediation hypothesis is justified, that is, transformational leadership does not directly influence the academic environment, but through the proximal mechanism of teacher attitudes. A dual-pathway conceptual model (Figure 1) is created from these two frameworks. Based on the literature, the following hypotheses are proposed: that transformational leadership has a direct impact on the academic environment (TL → AE) and an indirect impact (TL → TA → AE) via teachers' attitudes.

Figure 1
Theoretical and Conceptual Framework



Conceptual framework integrating Transformational Leadership Theory and Bronfenbrenner's Ecological Systems Theory (1979). The left column illustrates how transformational leaders inspire and support followers, leading to enhanced motivation and performance.

Methodology

Research Design

The current study used a quantitative descriptive-explanatory cross-sectional survey design (Creswell & Creswell, 2017). The design is appropriate for the testing of theoretically derived relationships among variables in a defined population at one point in time. This approach of applying PLS-SEM and bootstrapped mediation testing is in line with the recommendations provided by Hair et al. (2019) for exploratory structural modelling in educational research.

Population and Sampling

The target population was all the Government boys' secondary schools principals of Malakand Division, KP. The study area comprised five districts: Swat (80 principals), Shangla (45 principals), Malakand (44 principals), Dir Upper (47 principals) and Dir Lower (75 principals) with a total population of 291. Multistage random sampling was used, where Malakand Division was purposively selected due to documented sociocultural challenges, five districts were purposively selected to provide wide geographical representation, and principals in each district were randomly selected. Yamane's (1967) formula was used to determine sample size:

$$n = N / [1 + N (e^2)]$$

With $N = 291$ and $e = 0.05$, this yielded $n = 168$. District-proportionate distribution produced: Swat 46, Shangla 26, Malakand 25, Dir Upper 27, Dir Lower 44.

Instrumentation

Three constructs were assessed using a structured 35-item questionnaire (5-point Likert scale, 1= strongly disagree; 5= strongly agree) that was adapted from validated questionnaires. Transformational Leadership (13 items) was adopted from the Multifactor Leadership Questionnaire (Bass & Avolio). Academic Environment (17 items) was adopted from Fraser's (2019) School Environment Inventory. Teachers' Attitudes (5 items) was taken from Kagan's (1992) Teacher Belief Inventory. A panel of five experts in educational leadership at Abasyn University, Peshawar, and two senior education officers agreed on the content validity. A pilot study ($n = 10$) yielded Cronbach's $\alpha = 0.907$.

Reliability and Validity

The reliability and validity of the final sample were calculated using the program SmartPLS v4. Based on Hair et al. (2019), composite reliability ($CR > 0.70$), average variance extracted ($AVE > 0.50$), and heterotrait-monotrait (HTMT) ratio (< 0.85) were used as criteria. Each criterion was fulfilled, indicating internal consistency, convergent validity, and discriminant validity.

Data Collection and Ethical Procedures

The questionnaires were administered personally by the researcher in principals' schools. All participants were given a participant information sheet, a written consent form which assured anonymity, and the questionnaire. The questionnaires were filled in within 15-20 minutes. The data collection was carried out for 4 weeks with 100% response rate ($N = 168$). The approval of the Abasyn University Department of Education, Peshawar, for conducting this study was secured. It was voluntary, numerically coded questionnaires were used, and data were kept safe.

Data Analysis

The analysis of data was done in two phases. IBM SPSS v26 was used to calculate descriptive statistics (means, standard deviations, skewness, and kurtosis values) and Pearson correlation values. The measurement model (factor loadings, CR, AVE, and HTMT) and structural model (path coefficients, R²) were analyzed using PLS-SEM with the SmartPLS v4 software. The indirect effects procedure was used to test mediation using 5000 iterations of the bootstrapping procedure and bias-corrected accelerated (BCA) 95% confidence intervals. Significance threshold: p < 0.05.

Results

Demographic overview and descriptive patterns

A total of 168 government secondary school principals of the 5 districts of Malakand Division, Pakistan (Table 1) were surveyed. The cohort was mostly mid-career (64.9% aged 40–59), was an MA/MSc (76.9%) and had an M.Ed professional qualification (55.0%). The mean scores showed moderately high (scale range 13–65) transformational leadership (TL: 52.20 ± 7.40), moderately positive (scale range 17–85) academic environment (AE: 70.30 ± 9.50), and moderately positive (scale range 5–25) teacher attitudes (TA: 20.30 ± 3.10) (Table 2 & Fig 2). Skewness and kurtosis for all distributions satisfied the normality assumption (skewness |<1.3|, kurtosis < 8.9).

Figure 2

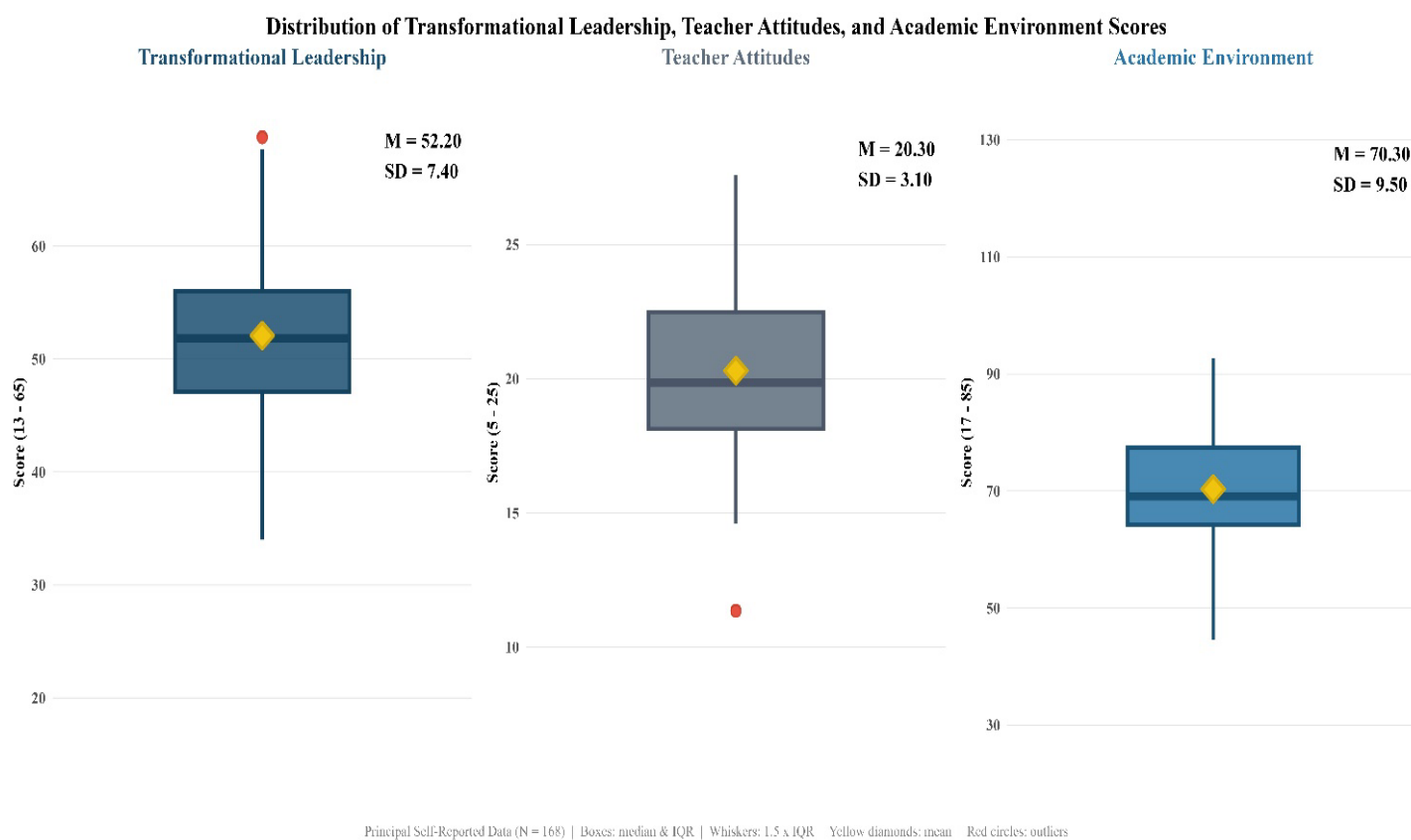


Figure 2 shows the distribution of Transformational Leadership, Teacher Attitude, and Academic Environment scores. Boxplots show medians and interquartile ranges (IQR) with whiskers at 1.5 × IQR. Outliers beyond the whiskers are shown as red circles; yellow diamonds show the group means. Mean and standard deviation values are indicated for each construct.

Table 1
Demographic Characteristics of Principals (N = 168)

Characteristic	Category	Frequency (n)	Percentage (%)
School Location	Urban	79	47.3
	Rural	89	52.7
Age	20–29 years	6	3.6
	30–39 years	50	29.6
	40–49 years	55	32.5
	50–59 years	55	32.5
	60+ years	3	1.8
Academic Qualification	BA/BSc	4	2.4
	MA/MSc	130	76.9
	M.Phil/MS	24	14.2
	PhD	5	3.0
Professional Qualification	B.Ed	47	27.8
	M.Ed	93	55.0
	M.A (Edu)	16	9.5
	M.Phil (Edu)	11	6.5
Administrative Experience	< 5 years	21	12.4
	5–9 years	37	21.9
	10–14 years	39	23.1
	15–19 years	44	26.0
	20+ years	28	16.6

Note. Categories with frequency < 5 are collapsed under 'Other' for parsimony.

Table 2
Descriptive Statistics of Study Variables (N = 168)

Variable	Items	Mean	SD	Actual Range	Potential Range	Skewness	Kurtosis
Transformational Leadership (TL)	13	52.20	7.40	19–65	13–65	–1.27	3.96
Academic Environment (AE)	17	70.30	9.50	32–126	17–85	0.22	8.81
Teachers' Attitudes (TA)	5	20.30	3.10	8–25	5–25	–0.82	2.33

Direct Association Between Transformational Leadership and Academic Environment

The Pearson correlation tested H_{a1} ; the findings revealed a strong positive bivariate correlation ($r = 0.775$, $p < 0.001$). This association was consistent across demographic subgroups, as well as by professional and academic qualification, but not by experience. Both TL ($F = 2.70$, $p = 0.04$) and AE ($F = 3.99$, $p < 0.001$) were significantly different according to one-way ANOVA with professional qualification, but not significantly different with academic qualification or administrative experience. Post-hoc (Tukey HSD) tests revealed that principals who had an M.Phil.

Those with Phil in Education (n = 11) had the highest TL (M = 57.55) and AE (M = 80.09) scores compared to those with B.Ed or M.Ed qualifications (Table 3 & Fig 3a).

Table 3

Pearson Correlations and Demographic Differences in TL and AE, Principals' Data (N = 168)

Panel A: Pearson Correlation Matrix			
Variable	1	2	3
1. Transformational Leadership (TL)	—		
2. Academic Environment (AE)	0.775	—	
3. Teachers' Attitudes (TA)	0.484	0.470	—
Panel B: One-Way ANOVA-Demographic Differences			
Academic Qualification	1.89	.13	2.14
Professional Qualification	2.70	0.04	3.99
Administrative Experience	1.43	0.23	1.71

Note. Panel A: $p < 0.001$ (two-tailed). Panel B: $p < 0.05$; $p < 0.001$. TL = Transformational Leadership; AE = Academic Environment; TA = Teachers' Attitudes. Post-hoc tests (Tukey HSD) were conducted for significant ANOVA results.

Mediation through Teacher Attitudes

Next, we applied partial least squares structural equation modelling (PLS-SEM) to break down the total effect into direct and indirect effects. The measurement model demonstrated good internal consistency (composite reliability < 0.78) and good convergent validity (AVE < 0.59). The results confirmed the discriminant validity (HTMT < 0.85 , see Table 4 for the complete loadings).

The structural model showed that TL had a strong direct positive relationship with AE (standardised path coefficient $\beta = 0.634$, bias-corrected 95% CI [0.490, 0.778], $P < 0.001$), thus supporting H_{a2} . Simultaneously, there was a significant indirect effect via teacher attitudes ($\beta = 0.089$, 95% CI (0.012, 0.168), $P = 0.023$), which suggested partial mediation (H_{a3} , H_{a4}). The indirect effect accounted for 12.3% of the total effect. The model explained 51.2% of the variance in the academic environment (SRMR = 0.068).

Prior to structural model testing, measurement model adequacy was verified (Table 4). Factor loadings ranged from 0.445 to 0.829, meeting the ≥ 0.40 threshold for exploratory PLS research. CR values exceeded 0.70 for all constructs (TL = 0.906; AE = 0.906; TA = 0.780), confirming internal consistency. AVE values exceeded 0.50 (TL = 0.623; AE = 0.598; TA = 0.614), establishing convergent validity. All HTMT ratios remained below 0.85, confirming discriminant validity. The measurement model was therefore deemed adequate.

Table 4

Measurement Model Quality Criteria

Construct	Factor Loadings Range	CR	AVE	Max HTMT
Transformational Leadership (TL)	0.538 – 0.766	0.906	0.623	< 0.85
Academic Environment (AE)	0.445 – 0.653	0.906	0.598	< 0.85
Teachers' Attitudes (TA)	0.735 – 0.829	0.780	0.614	< 0.85

Note. CR = Composite Reliability; AVE = Average Variance Extracted; HTMT = Heterotrait-Monotrait ratio. Threshold benchmarks: CR > 0.70 , AVE > 0.50 , HTMT < 0.85 (Hair et al., 2019).

Structural Model Testing

PLS-SEM was used to investigate the direct and indirect effect of transformational leadership (TL) on academic environment (AE) through teachers' attitudes (TA). The results of the structural model demonstrated that TL had a positive direct path to AE ($\beta = 0.634$, $SE = 0.073$, $t = 8.641$, $p < .001$; 95% CI [0.490, 0.778]), which supported H_{a2} (Figure 3). Simultaneously, the indirect effect of TL on AE via TA was positive and significant ($\beta = 0.089$, $SE = 0.039$, $t = 2.270$, $p = .023$; 95% BCA CI [0.012, 0.168]). The bootstrap confidence interval does not contain zero and it indicates that the partial mediation is statistically significant, therefore, H_{a3} and H_{a4} are supported. Teacher attitudes also contributed to 12.3% of the overall effect [$0.089 / (0.634 + 0.089)$], which shows that part of the effect of TL on AE is mediated through the effect of TA. The model accounted for 51.2% of the variance in academic environment ($R^2 = 0.512$), and the SRMR of 0.068 showed that the variance accounted for by the model was large and model fit was acceptable. These results are summarized in Table 5, Fig 3a and Fig. 3b.

Figure 3a.

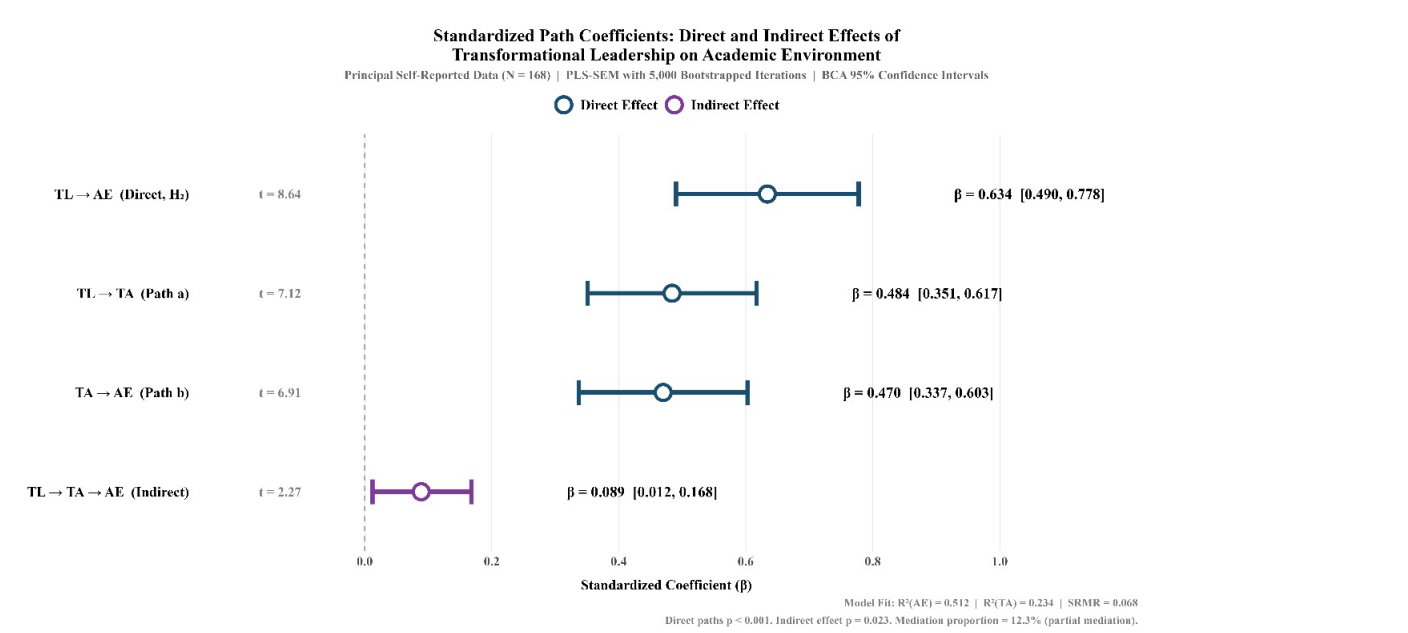


Figure 3a shows Standardized path coefficients and 95% bias-corrected accelerated bootstrap confidence intervals. Data collected by the principal and self-reported (N = 168). Direct paths were significant at $p < .001$ and the indirect path was significant at $p = 0.023$. Model fit: $R^2(AE) = 0.512$, $R^2(TA) = 0.234$, $SRMR = 0.068$. Partial mediation was observed with the mediated proportion equal to 12.3%.

Table 5

Direct and Indirect Effects-PLS-SEM (N = 168)

Path	B	SE	t-value	p-value	95% CI	Decision
TL $\rightarrow$ AE (H_{a2})	0.634	0.073	8.641	0.001	[0.490, 0.778]	Supported
TL $\rightarrow$ TA (Path a)	0.484	0.068	7.118	.000	[0.351, 0.617]	Significant
TA $\rightarrow$ AE (Path b)	0.470	0.068	6.912	.000	[0.337, 0.603]	Significant
TL $\rightarrow$ TA $\rightarrow$ AE	0.089	0.039	2.270	.023	[0.012, 0.168]	Supported

Note. SE = Standard Error; CI = Bias-Corrected Accelerated Bootstrap Confidence Interval (5,000 iterations); β = Standardised path coefficient. $p < 0.05$; $p < 0.001$. Model fit: $R^2(AE) = 0.512$, $SRMR = 0.068$.

Figure 3b

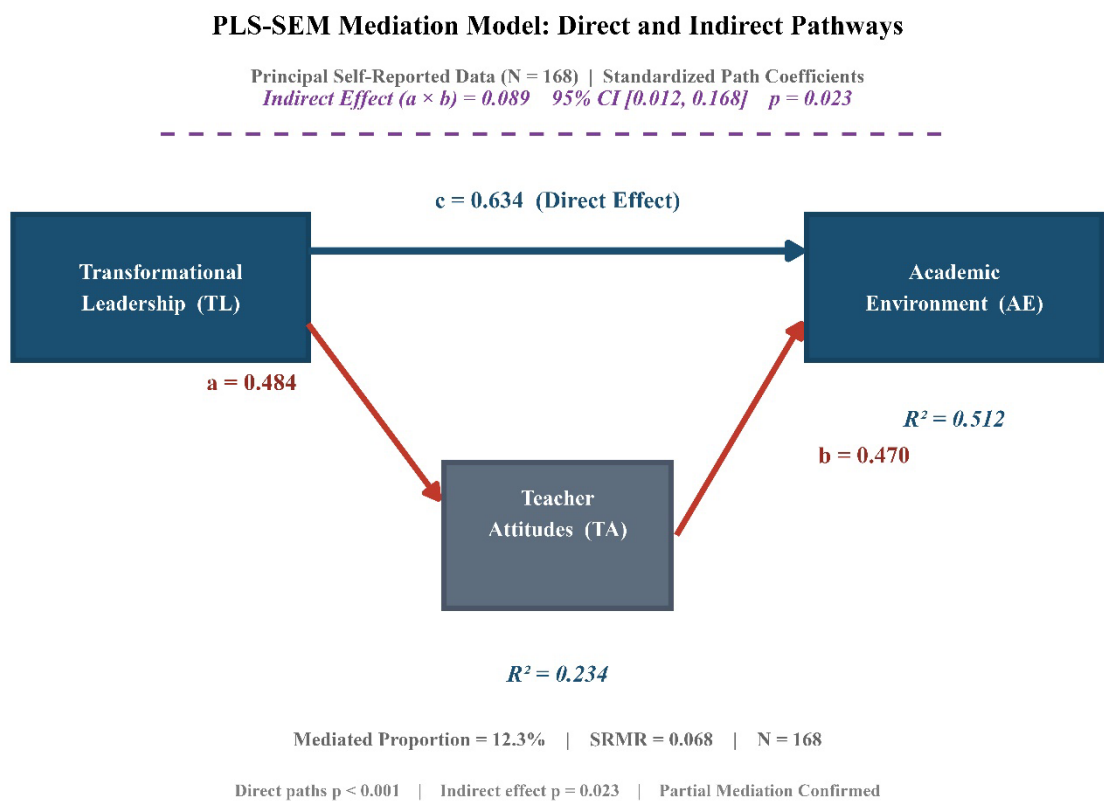


Figure 3b shows the PLS-SEM Mediation Model with Standardized Path Coefficients. TL = transformational leadership, TA = teacher attitudes, AE = academic environment. The indirect effect ($a \times b$) = 0.089, 95% CI [0.012, 0.168], $p = 0.023$. All direct paths were significant (at $p < 0.001$). The model accounted for 51.2% of the variance of academic environment and 23.4% of teacher attitudes.

Discussion

The current results show that principals' transformational leadership is significantly related to the quality of the academic environment in government boys' secondary schools of Malakand Division of KP. The correlation between the two constructs ($r = 0.775$) falls within the spectrum reported in previous educational leadership studies. Across multiple school systems, Leithwood and Jantzi (2019) reported effect sizes of 0.50–0.75, Dutta and Sahney reported an effect size of $r = 0.68$ in secondary schools in India (Dutta & Sahney, 2016), while Naz et al reported an effect size of $r = 0.64$ between transformational leadership and teacher motivation in Pakistan (Naz et al., 2020). This is slightly larger than the coefficient reported in the current study, which reflects the multidimensional nature of the academic environment construct that combines classroom, organizational, disciplinary, and social aspects and provides a wider bandwidth, or spectrum, of leadership influence.

However, the association might be inflated due to common-method variance because data relied solely on self-reports from the principals, and the cross-sectional nature of the study does not allow causal interpretation. It also found that there was a high direct path between transformational leadership and academic environment ($\beta = 0.634$, $p < 0.001$), supporting Bass and Riggio's (2006) idea that there is a relationship between leader behavior and organizational conditions. This direct relationship implies that a principal who communicates a clear vision, maintains fair discipline, provides resources strategically, and sets a personal example of ethical behavior will likely be accompanied by a more positive academic climate, even if teachers' attitudes are limited by other factors, like

poor pay or security issues. Meanwhile, a significant indirect link was found through teachers' attitudes ($\beta = 0.089$, $p = 0.023$) for the partial mediation, thus providing new principal data evidence in the context of Pakistan. The pattern is consistent with the idea that principals who inspire and challenge teachers are more likely to be related to high teacher motivation and commitment, and that these positive attitudinal states are more likely to be related to good classroom management, high collegiality, and high supportive social climate. The result of the indirect pathway with an effect of 12.3% shows that the pathway of attitude is not the main pathway of use, but it is the secondary pathway, as previously reported by authors (Hilal & Suriansyah, 2021; Osorno & Manonag, 2022), with a moderate mediation effect.

Overall, the model accounted for 51.2% of the variance in academic environment, highlighting the joint prediction of leadership and teacher attitudes in this context, but this figure may be inflated due to shared method variance. These results are theoretically consistent with the applicability of Bass's (1985) transformational leadership framework to a conflict-affected, resource-constrained context, and the substantial indirect path is congruent with Bronfenbrenner's (1979) ecological systems perspective, where leadership on the exosystem level is related to school climate and partly mediated by the microsystem of teacher attitudes. The implications of these findings in practical terms are that the four dimensions of transformational leadership could be considered useful strategies in principal recruitment, principal appraisal, and principal professional development, and the periodic teacher attitude surveys could be seen as early-warning indicators of school climate. There are a number of limitations that need to be recognized. The cross-sectional design means that causal relationships cannot be inferred, and the sample only includes boys' government schools, meaning generalizability is limited. Common-method and social desirability bias in the principal self-reports could inflate the associations, and the M.Phil. is too small. The power of the demographic comparisons was limited in M.Phil (Edu) subsamples ($n = 11$). To determine if the causal direction of the identified pathways is true and to validate the pathways' durability, longitudinal designs with multiple data sources (teacher reports, independent observations, and objective environmental indicators) will be necessary in order to strengthen the evidence base for leadership interventions in similar contexts.

Conclusion and Recommendations

The results of our study indicate that transformational leadership in principals is a strong predictor of academic environment quality in resource-limited secondary schools in the Malakand Division of Pakistan. A strong positive correlation between transformational leadership and academic environment ($r = 0.775$) was observed, and the structural equation model showed that there was a large direct pathway between transformational leadership and academic environment ($\beta = 0.634$) and a significantly indirect pathway through teachers' attitudes ($\beta = 0.089$). The mediation model explained more than half of the variance in academic environment ($R^2 = 0.512$), indicating that high principals' vision, intellectual stimulation, and individual teacher needs contribute to a positive school climate both directly through principals' managerial behaviors and indirectly by boosting teacher motivation and commitment. These findings expand the largely Western evidence base to an environment in a conflict-affected South Asian region and demonstrate the twofold mechanism of leadership (administrative and attitudinal) in relation to environmental improvement. From a pragmatic perspective, our study indicates that school leadership recruitment and development efforts focused on school leaders' active engagement in the four school dimensions of transformation and leadership monitoring of teacher attitudes may be a cost-effective way of improving academic contexts in similar low-resource school systems. Future studies should go beyond cross-sectional associations by using longitudinal frameworks and objective measures of the environment that would allow confirmation of the causal chain and its longevity.

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