

The Moderation and Mediation Effects of Organizational Climate on the Relationship Between Transformational Leadership and Teachers' Commitment of Public Medical Colleges in Henan Province

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Abstract

The objectives of this research were: (1) to develop the relationship model between transformational leadership and teachers' commitment, (2) to study the effect of transformational leadership on teachers' commitment, (3) to study the effect of transformational leadership on organizational climate, (4) To study the effect of organizational climate on teachers' commitment, (5) to study the mediation effect of organizational climate on the relationship between transformational leadership and teachers' commitment, and (6) To study the moderation effect of organizational climate on the relationship between transformational leadership and teachers' commitment.

This study was used a cross sectional quantitative survey research design by using a 5-points rating scale questionnaire for data collection. Population frame in this study were 5,925 teachers who are teaching in medical colleges in Henan Province in academic year 2023. Sample were 444 teachers that were randomly selected from population by using the multistage random sampling method. Descriptive statistics and structural equation model (SEM) as well as a latent mediation and moderation effect analysis were employed for data analysis.

Research results revealed that: (1) the relationship model was consisted of 3 latent variables, transformational leadership as independent variable, teachers' commitment as dependent variable, and organizational climate as moderator, and mediator, (2) transformational leadership had positive effect on teachers' commitment, (3) transformational leadership had positive effect on organizational climate, (4) organizational climate had positive effect had on teachers' commitment. (5) There was a mediation effect of organizational climate on the relationship between transformational leadership and teachers' commitment. (6) There was a moderation effect of organizational climate on the relationship between transformational leadership and teachers' commitment

Keywords: organizational climate; transformational leadership; teachers' commitment; mediation effect; moderation effect

Introduction

In the 21st century, society was in an era of reform and competition, and this feature was especially obvious in the field of education. At present, population mobility had given rise to a new logic in Chinese education, that is, from a mainly “local logic” to a “flow logic”, which has brought a new development background to the field of education (Education Research Editorial Department, 2022). Teachers were the most important human capital in schools, and the imbalance in teacher mobility would inevitably exacerbate the imbalance in educational development. Teachers’ commitment had become a key factor in the survival and development of schools and one of the important ways to improve the quality of education.

Entering the new era, the mission of school education had undergone profound changes, and the transformation of school leadership models had become an inevitable trend in the development of modern school organizations. Transformational leadership behaviors help shape a school culture and organizational structure characterized by mutual trust, respect, and collaborative communication. (Glisson, C., & Durick, M., 1988). Principals’ transformational leadership had a positive impact on teachers’ commitment (Leithwood, K., & Jantzi, D., 2000). Research by many scholars had shown that in the field of education, leaders’ transformational leadership style could promote teachers’ commitment to the organization.

Based on the research of organizational behavior and human resource management, to further understand the potential process of transformational leadership affecting teachers’ commitment, researchers introduced organizational climate as a variable, analyzed its mechanism from perspective of mediation and regulation, and gained deeper understanding of relationship between teachers and teachers. Interaction and compatibility between schools further enrich existing research conclusions.

As a major province in education, Henan had problems such as unbalanced educational development, lack of resources, and lagging school-running concepts. Teachers’ work was under high pressure, and their salary levels were low or at the bottom of the country, which seriously affected teacher satisfaction and career development. Teacher turnover and attrition rates were high. This situation was particularly obvious in medical colleges in Henan Province, and attention to teachers’ commitment cannot be delayed. This research took public medical colleges in Henan Province as the research object to explore the relationship between transformational leadership and teachers’ commitment, as well as the mediating and moderating effects of organizational climate on the relationship between transformational leadership and teachers’ commitment. In this specific context, the researchers hoped to provide valuable reference and guidance for school management reform and development.

Research Objectives

1. To construct the relationship model between transformational leadership and teachers’ commitment.
2. To study the effect of transformational leadership on teachers’ commitment.
3. To study the effect of transformational leadership on organizational climate.
4. To study the effect of organizational climate on teachers’ commitment.
5. To study the mediation effect of organizational climate on the relationship between transformational leadership and teachers’ commitment.
6. To study the moderation effect of organizational climate on the relationship between transformational leadership and teachers’ commitment.

Research Hypothesis

- H1: Transformational leadership has positive effect on teachers' commitment.
 H2: Transformational leadership has positive effect on organizational climate.
 H3: Organizational climate has positive effect on teachers' commitment.
 H4: Organizational climate has mediation effect relationship between transformational leadership and teachers' commitment.
 H5: Organizational climate has moderation effect relationship between transformational leadership and teachers' commitment.

Research Conceptual Framework

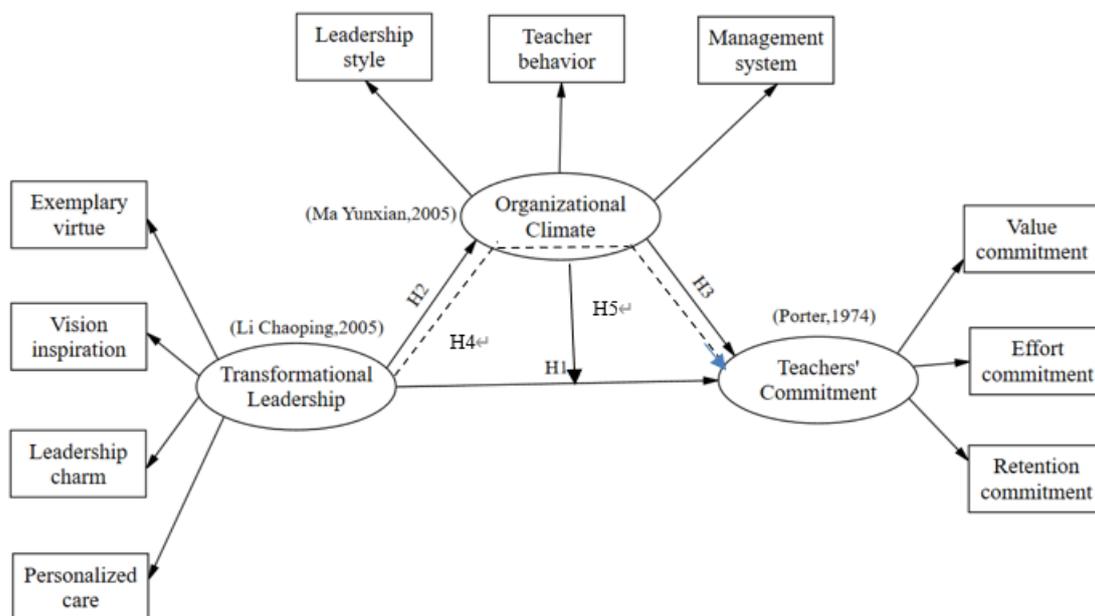


Figure 1 Research Conceptual framework

Research Methodology

Population and sample

The research was adopted a quantitative survey research. The population in this research were 5,925 teachers who were teaching in eight public medical colleges in Henan Province, China, in academic years 2023. The sample were selected by using a proportional stratified random sampling method, the sample size was calculated by using a G*power software, the sample were 321 teachers.

Instruments

Steps in instrument development: (1) Study related literature about variables used in the model, (2) create questions or measurement items for each variable based on these operational definitions, (3) determined the index of item-objective congruence (IOC) to evaluate content validity, which requires 5 expert reviews, (4) improved the measurement tools based on try-out with 30 teachers who were not selected as samples to ensure the instrument

reliability, and (5) calculate Cronbach’s Alpha coefficient and McDonald’s ω to indicate the internal consistency of questionnaires and items.

This research designed questionnaires to research the mediation and moderation effects of organizational climate on the relationship between transformational leadership and teachers’ commitment of public medical colleges in Henan Province. Two parts were as follows:

Part 1: Basic information of respondents, 4 items in total. It included gender, age, educational background, etc.

Part 2: The instrument used in this research was a rating 5-point Likert scale. There were 3 questionnaires: (1) questionnaire on teachers perceived transformational leadership; (2) questionnaire on teachers perceived organizational climate; (3) questionnaire on teachers’ self-evaluation of organizational commitment.

Data Collection

Researchers collected data by distributing questionnaires to teachers in 8 public medical colleges in Henan Province during the academic year 2023, and conducting online surveys by WeChat. The researchers distributed 350 questionnaires in total, and 321 valid test papers remained. To ensure accurate and meaningful responses, researchers provided clear instructions and explanations regarding the purpose of questionnaires, the method of filling them out, and any relevant precautions.

Data analysis

1. Descriptive statistics

Data analysis were used descriptive statistics for described the sample characteristics, the Confirmatory Factor Analysis (CFA) for measure the quality of data measurement, and used Structural Equation Model (SEM) for hypothesis testing.

Demographic characteristics.

Table 1. Samples Information

Level	n.	Percent	Cumulative Percent
Gender			
Male	143	44.5	44.5
Female	178	55.5	100.0
Age			
<35	74	23.1	23.1
35-40	98	30.5	53.6
41-50	90	28.0	81.6
51-60	56	17.4	99.1
>60	3	0.9	100.0
Education			
Undergraduate	85	26.5	26.5
Master	192	59.8	86.3
Doctor	29	9.0	95.3
Others	15	4.7	100.0
Professional title			
Junior title	31	9.7	9.7
Intermediate title	147	45.8	55.5

Deputy senior title	115	35.8	91.3
Senior title	28	8.7	100.0
Total	321	100.0	100.0

Table 1 showed demographic statistics for the sample, encompassed gender, age, professional title, and educational background. These data reflect the multifaceted demographic characteristics of the sample.

Quantitative data analysis

Table 2 showed descriptive statistics for all observed variables in the research, labeled as TL1-TL4, OC1-OC3, TC1-TC3. These descriptive statistics provide a foundational data background for subsequent factor analysis, aiding in understanding variable characteristics and distribution patterns and correlation coefficient among variables.

Descriptive and correlation analysis

Table 2 The means standard deviation and inter-correlation coefficient matrix of indicators between observed variables in CFA model (n=321)

	\bar{x}	SD	TL1	TL2	TL3	TL4	OC1	OC2	OC3	TC1	TC2	TC3
TL1	4.52	0.67	1.00									
TL2	4.48	0.66	0.709**	1.00								
TL3	4.41	0.67	0.534**	0.684**	1.00							
TL4	4.42	0.63	0.733**	0.835**	0.729**	1.00						
OC1	4.46	0.70	0.277**	0.312**	0.275**	0.253**	1.00					
OC2	4.28	0.79	0.261**	0.326**	0.275**	0.249**	0.416**	1.00				
OC3	4.37	0.68	0.189**	0.264**	0.269**	0.211**	0.399**	0.434**	1.00			
TC1	4.40	0.67	0.325**	0.343**	0.296**	0.298**	0.251**	0.304**	0.291**	1.00		
TC2	4.39	0.68	0.38**	0.355**	0.327**	0.346**	0.302**	0.304**	0.32**	0.719**	1.00	
TC3	4.47	0.65	0.398**	0.357**	0.297**	0.342**	0.271**	0.276**	0.234**	0.508**	0.605**	1.00

Note. ** p < .01,

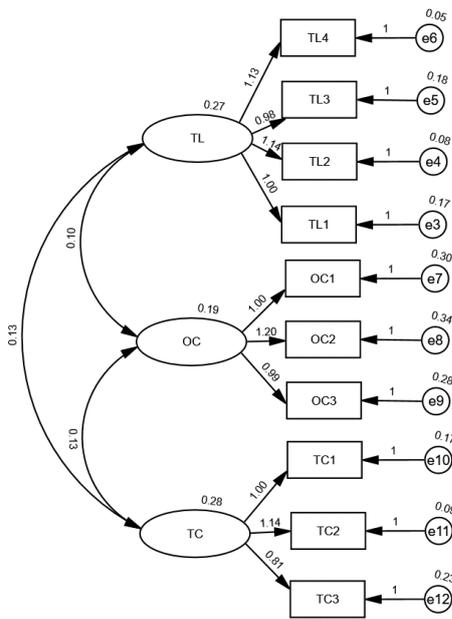
Table 2 showed descriptive statistics, the means ranged from 4.37 to 4.52 and standard deviation ranged from 0.63 to 0.79 and the pairs of correlation range from 0.211 to 0.835 and all pairs were statistically significant (p.<0.01).

Confirmatory Factor Analysis

In this study, the measurement model was assessed by using confirmatory factor analysis (Brown, & Paul, G., 2015). The outcomes derived from confirmatory factor analysis are presented below. The absolute fit indices yielded the following results: $\chi^2(p) = 52.738$ (df=32), $\chi^2/df = 1.648$, and RMSEA = 0.045. The RMSEA is considered a measure of the overall fit quality, where values closer to 0 indicate a better fit and larger values suggest a poorer fit. Regarding the RMSEA, values lower than 0.05 indicate a minimal approximation

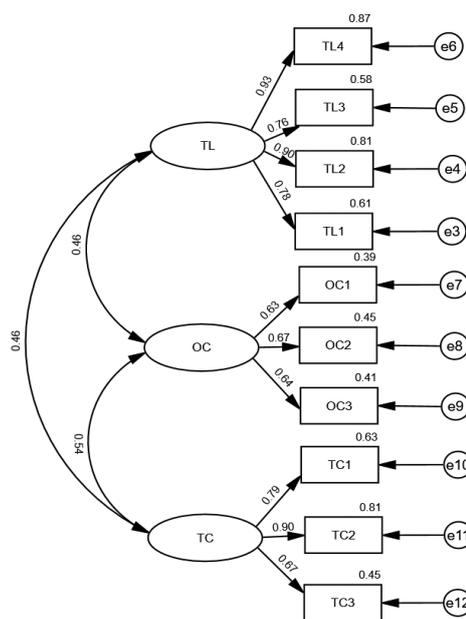
error, values ranging from 0.05 to 0.08 suggest an acceptable level of approximation error, and values higher than 0.10 indicate a substantial discrepancy between the model and the observed data, indicating poor fit (Hu, L. T., & Bentler, P. M., 1999). The incremental fit indices, including GFI = 0.969 and CFI = 0.987, indicated the measurement model fit well to the empirical data.

Measurement model analysis



chi-square=52.738 df=32 p=.012 chi-square/df=1.648
 GFI=.969 AGFI=.947 CFI=.987 RMSEA=.045

Figure 3 Standardized estimates



chi-square=52.738 df=32 p=.012 chi-square/df=1.648
 GFI=.969 AGFI=.947 CFI=.987 RMSEA=.045

Figure 4 Unstandardized estimates

Table 3. Estimated factor loading, Average Variance Extracted (AVE) and Composite Reliability (CR)

Latent variables	Indicator	Estimate	Beta	S.E.	z	p	AVE	CR
TL	1 Exemplary virtue (TL1)	1.000	0.780				0.718	0.910
	2 Vision inspiration (TL2)	1.137	0.900	0.063	18.085	***		
	3 Leadership charm (TL3)	0.979	0.765	0.066	14.726	***		
	4 Personalized care (TL4)	1.125	0.931	0.06	18.731	***		
OC	1 Leadership style (OC1)	1.000	0.628				0.417	0.682
	2 Teacher behavior (OC2)	1.203	0.671	0.152	7.909	***		
	3 Management system (OC3)	0.985	0.628	0.127	7.767	***		
TC	1 Value commitment (TC1)	1.000	0.792				0.630	0.834
	2 Effort commitment (TC2)	1.142	0.901	0.078	14.724	***		
	3 Retention commitment (TC3)	0.815	0.672	0.067	12.088	***		

Note Beta = factor loading in standardized.

The quality analysis of constructs were shown in table 3, all factor loadings of the three constructs were statistically significant, and the standardized factor loadings were more than 0.50 (Hair, J. F., et al., 2019), shown that all indicators of the three constructs were acceptable. The scale reliability was assessed based on the composite reliability (CR) of construct transformational leadership, organizational climate, and teacher commitment, there values were 0.910, 0.682, and 0.834 respectively, which were met the threshold value of 0.70 (Hair, J. F., et al., 2019) except the composite reliability of organizational climate were slightly less than the cutoff criteria. In order to assess convergent validity, the average variance extracted (AVE) were analyzed and found that all constructs were met the cutoff criteria value of 0.50 (Hu, L. T., & Bentler, P. M., 1999) except the AVE of organizational climate was slightly less than cutoff criteria.

Hypothesis testing
Structural Equation Models

The hypothesis testing in Table 4, revealed that all the direct hypotheses (H1 to H3) exhibit statistically significant, showed that all three direct effects hypotheses were supported by empirical data. The mediation effect (H4) has the estimated path coefficient of 0.105 and had statistically significant ($p < .001$), this hypothesis was accepted, show that there was mediation effect of organizational climate on the relationship between transformational leadership and teacher commitment. The hypothesis testing of the moderation effect (H5) had the path coefficient of 0.049 and was statistically significant ($p < .001$) this hypothesis was accepted, which showed that the relationship between transformational leadership and teacher commitment is not the same between the level of organizational climate, and need to the probing interaction analysis (Collier, J. , 2020) in order to interpreted the moderation effect.

2. Probing interaction analysis

Probe the interaction means exploring how the relationship from the independent variable to the dependent variable changes in different levels of the moderator (Collier, J. , 2020). To do probing the researcher categorized the moderator into 3 levels namely; low level (Mean-1SD), medium level (Mean-SD), and high level (Mean+1SD), then analyzed the mediation model for each level of moderator. The results of the data analysis were presented in Figure 7-9 and Table 10 as follows:

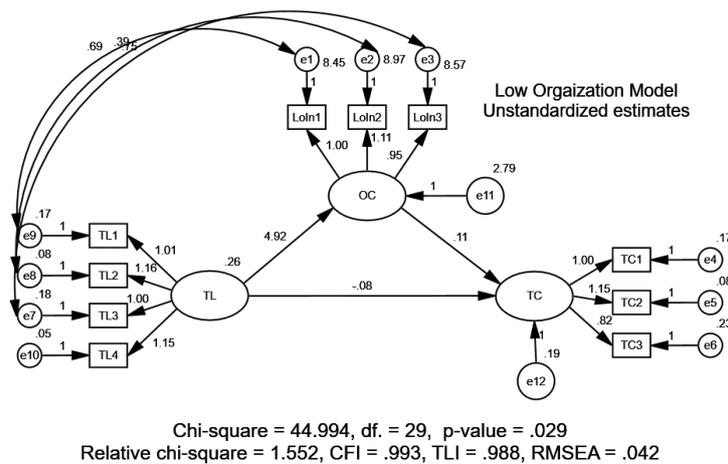


Figure 6 Mediation model for low level of organizational climate

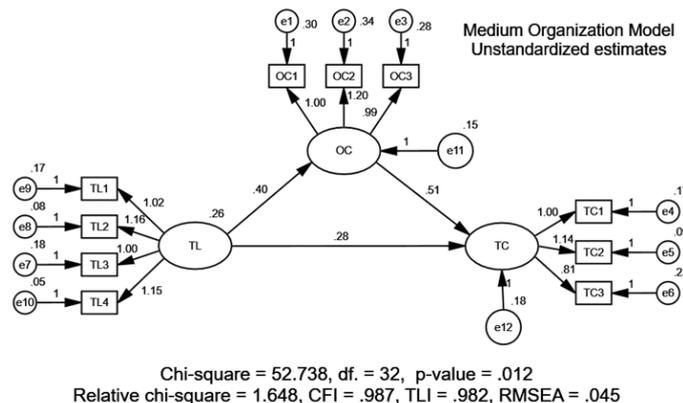


Figure 7 Mediation model for medium level of organizational climate

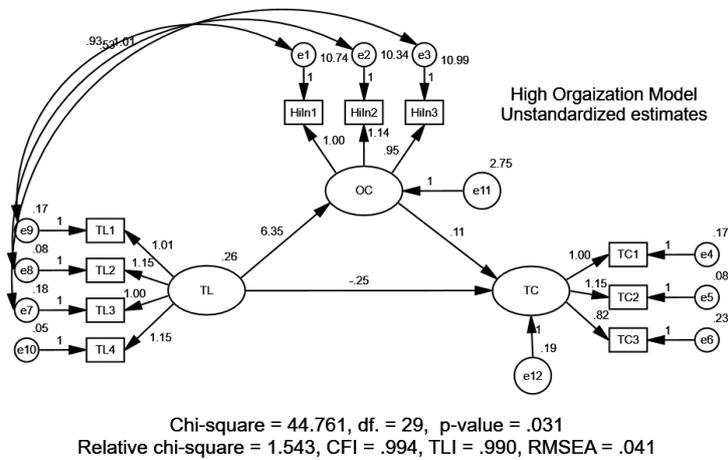


Figure 8 Mediation model for high level of organizational climate

Figures 7 to 9 showed the relationship from the independent variable to the dependent variable changes in different levels of the moderator. The coefficient in the medium level showed a moderation effect.

Table 5 probing interaction (Conditional Mediation) analysis.

Moderator levels		95% C.I.								
MOD	Type	Effect	Estimate	SE	Lower	Upper	β	z	p	
Mean-1-SD	Indirect	TL \Rightarrow OC \Rightarrow TC	0.555	0.154	0.341	0.826	0.533	3.603	0.013	
Mean-1-SD	Component	TL \Rightarrow OC	4.92	0.421	3.982	6.112	0.832	11.68	<.001	
Mean-1-SD		OC \Rightarrow TC	0.113	0.024	0.055	0.163	0.641	4.665	<.001	
Mean-1-SD	Direct	TL \Rightarrow TC	-0.078	0.127	-0.422	0.314	-0.075	-0.616	0.538	
Mean-1-SD	Total	TL \Rightarrow TC	0.477	0.103	0.262	0.679	0.458	4.631	0.005	
Mean	Indirect	TL \Rightarrow OC \Rightarrow TC	0.203	0.077	0.088	0.392	0.193	2.636	0.001	
Mean	Component	TL \Rightarrow OC	0.398	0.067	0.196	0.641	0.459	5.93	<.001	
Mean		OC \Rightarrow TC	0.509	0.104	0.231	0.857	0.421	4.89	<.001	
Mean	Direct	TL \Rightarrow TC	0.281	0.071	0.096	0.485	0.268	3.935	<.001	
Mean	Total	TL \Rightarrow TC	0.484	0.1	0.297	0.68	0.461	4.84	0.001	
Mean+1-SD	Indirect	TL \Rightarrow OC \Rightarrow TC	0.772	0.215	0.367	1.219	0.378	3.591	0.001	
Mean+1-SD	Component	TL \Rightarrow OC	6.346	0.489	5.355	7.57	0.89	12.991	<.001	
Mean+1-SD		OC \Rightarrow TC	0.114	0.024	0.054	0.189	0.78	4.69	<.001	
Mean+1-SD	Direct	TL \Rightarrow TC	-0.245	0.158	-0.755	0.193	-0.236	-1.551	0.121	
Mean+1-SD	Total	TL \Rightarrow TC	0.476	0.1	0.29	0.674	0.458	4.58	0.001	

Note. Betas are completely standardized effect sizes

The data analysis in Table 4.10 showed the comparison of relation models between organizational climate groups - low (Mean-SD), medium (Mean), and high (Mean +SD) - to identify the moderation effects. In total effect, the low group and the high group had a path coefficient of 0.477, 0.476, while the medium group had a coefficient of 0.484 and was statistically significant. The data analysis revealed that the total effects between groups were not the same; the medium group had the most effect followed by the low group and the high group, indicating a moderation effect.

The relationship between transformational leadership and teachers' commitment comparing between levels of organizational climate showed as Figure 10.

Figure 10 Hypothesis testing of moderation effects

Figure 10 showed that when there was an interaction effect organizational climate moderation effect relationship between transformational leadership which affected the teachers' commitment was not the same between groups of organizational climate, in the low (Mean-1SD) organizational climate, the path coefficient of the relationship between transformational leadership and teachers' commitment was -0.078 which was not statistically significant ($p=0.538$) showed that there was no

relationship between transformational leadership and teachers' commitment, in the medium (Mean) organizational climate, the path coefficient of the relationship between

transformational leadership and teachers' commitment was 0.281 which was statistically significant ($p<.001$) and positive direction, showed that there was a positive relationship between transformational leadership and teachers' commitment, and in the high (Mean+1SD) organizational climate, the path coefficient of the relationship between transformational leadership and teachers' commitment was -0.245 which was statistically significant ($p<.001$) and negative direction, showed that there was a negative relationship between transformational leadership and teachers' commitment. The moderation effect of organizational climate on the relationship between transformational leadership shown in Figure 9 below:

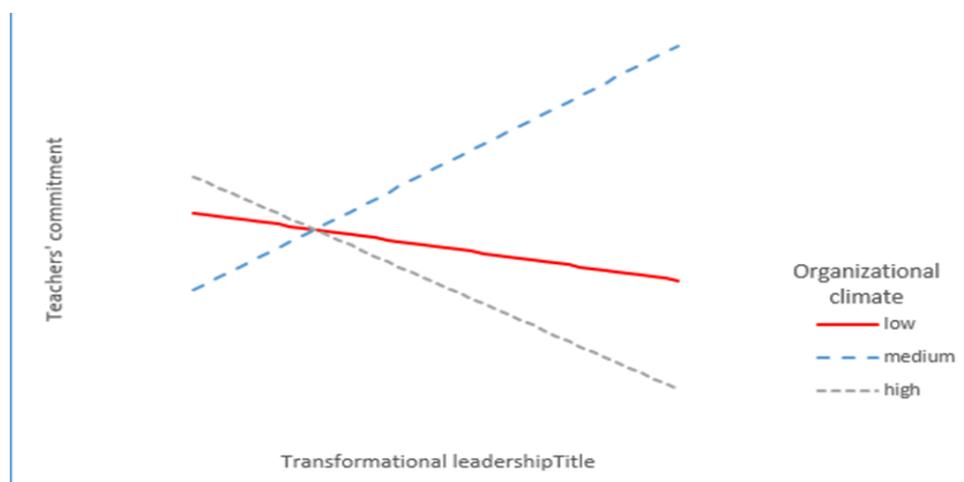


Figure 9 moderation effect of organizational climate on the relationship between transformational leadership

Discussion

The major finding of objective 1 showed that the main factors affecting teachers' commitment of public medical colleges in Henan Province were transformational leadership and organizational climate. Transformational leadership included 4 dimensions: vision inspiration, exemplary virtue, leadership charm, and personalized care (Li Chaoping, & Shi Kan., 2005). Organizational climate included 3 dimensions, namely leadership style, teacher behavior, and management system (Ma Yunxian, 2005). And teachers' commitment included 3 dimensions: value commitment, effort commitment, and retention commitment (Porter, L. W., et.al, 1974).

The major finding of objective 2 showed that transformational leadership has positive effect on teachers' commitment. This research conclusion was consistent with the findings of many scholars such as Khasawneh et al. (2012), Guo Lin (2016), Chen Zhiyong (2017), Zhang Wanying & Mao Yaqing (2022), etc. The findings emphasized the key role of school leaders in shaping teachers' job satisfaction and organizational commitment, helping them better demonstrate their ability traits to meet teachers' expectations and needs, and enhancing teachers' commitment.

The major finding of objective 3 showed that transformational leadership has positive effect on organizational climate. This research conclusion was consistent with the findings of many scholars such as Dixon, D. L. (2013), Wang Lei, et al. (2013), Lin Hechun, & Kang Huiya(2015), Liu Jia(2022), etc. This leadership approached not only promotes an open, trusting, and supportive learning environment, but it also inspired the potential of teachers and students and strengthens their shared commitment to the school's vision and goals.

The major finding of objective 4 showed that organizational climate has positive effect on teachers' commitment. This research conclusion was consistent with the findings of many scholars such as Chen Zhixiong (2010), Danish, R. Q., et al.(2015), Lin Zhili (2015), Khan, N.(2019), Sudjarwo S.(2019), etc. When teachers work in an atmosphere that encourages innovation, personal growth, and teamwork, they were more likely to feel satisfied and fulfilled, which increased their commitment to schools.

The major finding of objective 5 showed that organizational climate has mediation effect relationship between transformational leadership and teachers' commitment. This research conclusion was consistent with the findings of many scholars such as Huang Youli, Cheng Xinyu, Dou D, Hou Haoxiang, Rong Wei, etc. Transformational leadership not only improves teacher commitment by directly influencing teachers' attitudes and behaviors but also indirectly promotes the improvement of teacher commitment by creating a positive organizational climate.

The major finding of objective 6 showed that organizational climate has moderation effect on the relationship between transformational leadership and teachers' commitment. The medium group of organizational climate had positive and high effect on their relationship. This conclusion was consistent with the findings of scholars such as Jiang Liqin, et al. (2018), Zhang Chuanqing & Yuan Dongxu (2021), Suo Changqing, et al. (2022), Wang Fang & Liu Hao (2022), etc. Organizational climate provided fertile soil for the concept and practice of transformational leadership, making it more effective in promoting teacher commitment. In short, organizational climate not only directly affected teachers' feelings and behaviors, but also strengthens the positive effect of transformational leadership on teachers' commitment.

Conclusion

The relationship model by using structural equation modeling constructed in this research clarified the influencing factors of teachers' commitment of public medical colleges in Henan Province and has a strong fit with the empirical data.

Research findings were as follows:

1. The main factors affecting teachers' commitment in public medical colleges in Henan Province were transformational leadership and organizational climate.
2. Transformational leadership has positive effect on teachers' commitment.
3. Transformational leadership has positive effect on organizational climate.
4. Organizational climate has positive effect on teachers' commitment.
5. Organizational climate has mediation effect relationship between transformational leadership and teachers' commitment.
6. Organizational climate has moderation effect relationship between transformational leadership and teachers' commitment.

Recommendations

Recommendation for policy formulation

1. Strengthen transformational leadership training. Policymakers from the government and school management departments should support and encourage public medical school administrators to accept transformational leadership training and development programs to effectively improve to better respond to challenges and changes in the education field.
2. Optimize and maintain a positive organizational climate. Administrators should be people-centered and student-centered, promote the construction of an open, inclusive, and supportive organizational climate, and improve the overall performance of schools.
3. Promote teachers' participation in decision-making. Encourage and promote teachers' participation in school management and policy formulation by establishing a more open and inclusive decision-making process to enhance their sense of belonging and commitment.
4. Pay attention to individual differences. School policies should be developed to take into account the possible differences in the needs and expectations of different teachers. Supporting teachers' personal and professional growth further enhances teachers' commitment and their willingness to stay and serve.
5. Establish an effective reward mechanism. Set up and implement incentives and reward systems for teacher performance and contributions. These mechanisms should be fair, transparent, and designed to stimulate teachers' enthusiasm and creativity.
6. Establish feedback and evaluation mechanisms. Establish effective monitoring and evaluation mechanisms. Regularly track the progress and effects of policy implementation to ensure that policy achieves expected goals. Establish feedback mechanisms to further policy formulation and optimization adjustments in schools.

Recommendation for practical application

1. School leaders should implement transformational leadership and shift from empirical leadership to rational leadership. Leaders should strengthen theoretical study, make transformational leadership a conscious behavior, and seek development through change. Play a good role as a leader and helmsman, lead by example, and inspire teachers' value and effort

commitment through vision motivation, intellectual stimulation, personalized care, etc., and loyalty to education and school organization. Transformational leaders should learn to tolerate conflicts, resolve conflicts, and mitigate crises.

2. Stimulate high-level needs through transformational leadership and form a good school organizational atmosphere. By stimulating and satisfying teachers' high-level needs, establishing teachers' professional learning communities, etc., it can enhance teachers' sense of ownership of school management and overall awareness of school progress, create an organizational atmosphere in the school that encourages innovation, and improve teachers' commitment levels.

3. Teachers should take the initiative to improve organizational commitment and form professional awareness. The formation of teachers' commitment is the result of the joint effects of teachers' own conditions, subjective efforts and school support. Individual teachers must give full play to their subjective initiative, form professional awareness, and better integrate into the school organization; they must cultivate team awareness and establish good interpersonal relationships; they must improve their own ideal awareness and overall awareness, enhance their emotions for the teaching profession, and practice in teaching. Continuously pursue and realize self-worth.

Recommendation for Further Research

Future research prospects can be expanded and deepened around the following directions:

1. Continue to review relevant domestic and foreign literature, incorporate new developments in relevant theories into subsequent research, and further explore the breadth and depth.

2. Improve the rationality and scientificity of research conclusions, expand the scope of research, increase sample selection, and enhance the representativeness of research.

3. Through cross-cultural or cross-regional comparative analysis, explore the similarities and differences in the impact of organizational climate and transformational leadership on teacher commitment under different educational systems and cultural backgrounds.

4. Further explore other possible mediating or moderating variables besides organizational climate, such as teacher self-efficacy, job satisfaction or the trust relationship between leaders and teachers, to fully understand the complex relationship between transformational leadership and teacher commitment.

5. Conduct long-term follow-up studies to examine the long-term effects of transformational leadership and organizational climate on teacher commitment and its subsequent effects (e.g., teaching quality, student satisfaction, and overall school performance).

6. Based on existing theoretical research, conduct empirical research and intervention experiments to test the effects of different leadership development and organizational climate optimization strategies on improving teacher commitment.

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