

A Cross-level Interaction Effects of Organizational Climate on the Relationship between Personal Factors and Art Teachers' Professional Leadership in Higher Educational Institutions in Hunan Province: A Multilevel Analysis

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Abstracts

The objectives of this research were: (1) To study the organizational contextual effects that affect Art teachers' professional leadership, (2) to study the effects of personal factors on Art teachers' professional leadership when the influence of organizational climate remains unchanged, (3) to study the effects of organizational climate on Art teachers' professional leadership in the organizational level when controlling the organizational contextual effects constant, and (4) to study the cross-level interaction effect of organizational climate on the relationship between personal factors and Art teachers' professional leadership.

The research method was a quantitative survey research, Multilevel Structural Equation Model (MSEM), including individual and organizational levels. Population were divided into 2 sub-populations that were hierarchically nested namely (1) Art teachers and (2) administrators of Fine Art faculty who were working in public colleges and universities in Hunan Province, people's republic of China in the academic year 2023. The sample of the Art teacher group and administrator group were selected by the multi-stage proportional random sampling method, the total sample were 300 art teachers at the individual level and 100 administrators at the organizational level.

The research findings revealed that (1) The art teachers' professional leadership was affected by the organizational contextual effects; (2) When the influence of organizational climate remains unchanged, the teaching-age and characteristics in the personal factors had a direct impact on art teachers' professional leadership while gender, self-efficacy and personal leadership skill did not significantly affect art teacher leadership; (3) without considering the organizational climate of a certain university, the organizational climate had an effect on art teachers' professional leadership; (4) organizational climate had cross-level interaction with individual characteristics and personal leader skill effects on art teachers' professional leadership, but the cross-interaction with gender, Teaching-Age, and self-efficacy found not significantly effect on Art teachers' leadership.

Keywords: Organizational climate; Personal Factors; Art Teachers' Professional Leadership; Multilevel Analysis.

Introduction

In today's era, with the development of economic globalization, social informatization, and comprehensive integration of science and technology, the competition for comprehensive national strength between countries is more intense, and its core is the competition of knowledge innovation and top talents, which means that we need a lot of innovative talents, cultivating this type of talents requires professional teachers with excellent innovative research capabilities. In January 2018, the CPC Central Committee and the State Council issued the Opinions on Comprehensively Deepening the Reform of Building Teachers in the New Era, making comprehensive arrangements for deepening the reform of building teachers in the new era (the CPC Central Committee and the State Council, 2018 : online). In 2021, in "in An Important Discussion on Teachers' Ethics and Style ", General Secretary Xi Jinping pointed out: "The prosperity of the country, the rejuvenation of the nation, the development of education, we need to vigorously cultivate a high-quality professional teacher with noble ethics, professional skills, reasonable structure, full of vitality. (Xi, 2021) " "Teachers are wise leaders of the community. As leaders, teachers do not lie in their position, but in their profound knowledge and mature experience." From John Dewey, a famous American educator in the early 20th century, clearly put forward the conclusion that "teachers are leaders" (Dewey, 2005:1). Teachers' professional leadership is an interdisciplinary research field of leadership, management and teacher pedagogy, and other related disciplines. American educator (Hallinger, 1992: 2-8).pointed out that effective teaching professional leadership is the main feature of successful education and teaching, the key factor determining the quality of education, and the core driving force for the development of students, teachers, and schools. So, one of the focuses of this study was art teachers' Professional leadership. The researcher introduced contextual effects, because the higher education system is mostly a hierarchical organizational structure, and the development of teachers' professional leadership must be embedded in the institute community. In the analysis of multi-level data, if there are independent variables at the individual level, regardless of whether the contextual variables influential, situational variables are influencing factors that researcher cannot ignore (Fang, Qiu, & Zhang, 2011: 284-292) . And in the research of teachers' professional development, the organizational climate has a significant impact on teachers' professional development. (Zheng, 1986:1; Pan, 2014:1; Duan, 2008:1)

There are relatively typical problems in the organizational climate of colleges and universities in Hunan: First, the leaders and teachers of some colleges and universities pay more attention to collectivist culture, and they value peace and respect in everything, and they are more likely to form a strong climate of helping others, but they are not very strong voice climate (Duan, Wang, & Zhu, 2014;1964-1974); and researcher (Frazier, 2009:1) indicated that group involvement climate will significantly affect team performance through group voice climate, and its influence is suppressed by leaders Negative regulation of behavior. Second, studies have shown that young teachers face greater difficulties in scientific research and production and pressure for promotion, and there are negative incentives in the incentive mechanism of colleges and universities. Third, judging from the research results announced by various institutions, art and design colleges belong to the humanities, because of the local and regional limitations of their research content, fewer platforms and opportunities for international cooperation, and a relative shortage of international scientific research results. And government support is relatively low.

Research Objectives

1. To study the organizational contextual effects that affect Art teachers' professional leadership.
2. To study the effects of personal factors on Art teachers' professional leadership, when controlling the organizational contextual effects constant.
3. To study the effects of organizational climate on Art teachers' professional leadership, when controlling the organizational contextual effects constant.
4. To study the cross-level effect of organizational climate on the relationship between personal factors and Art teachers' professional leadership.

Research Methodology

The research design was a survey quantitative method by employing the Multilevel Structural Equation Model (MSEM) (Little, Bovaird, & Card, 2007:1), which was a two-level analysis, included the individual level and the organizational level.

Population and Samples

The population in this study were (1) Art teachers and (2) administrators of Fine Art faculty who were working in public colleges and universities in Hunan province in the academic year 2023, the two sub-populations were hierarchically nested.

Hunan Province has a total of 32 public undergraduate institutions, of which 27 universities have art and design-related disciplines. Some universities have 2-3 art and design-related faculties, like, Hunan University has 2 faculties with art-related majors; Hunan Normal University has 3 design and art colleges; Hunan Technology and Business University has 2. Therefore, there are 27 public undergraduate colleges and universities and 31 colleges in Hunan with art and design majors. The researchers used the multistage random sampling method to select sample. Stage 1, 25 public colleges and universities which consisted of art faculty in Hunan province were randomly selected by using simple random sampling, then 4-7 administrators for each faculty, the dean, and other assistants were selected as sampling unit at the organizational level or level-2. The total samples in this level were 100 administrators. Stage 2 randomly selected 24 Art teachers from each faculty that have been selected in stage 1 by using simple random sampling as a sampling unit at personal level or level-1. The total samples in the personal level were 300 Art teachers.

Instrumentation Development and Quality

The level 1 was individual level, had independent variables, Art teachers' professional leadership that had 3 indicators namely, (1) Academic innovation and research ability (2) Teaching leadership ability, and (3) Development of organizational cohesion ability. And a dependent variable, Personal factors which also composed 5 indicators, namely (1) Gender, (2) Teaching-Age, (3) Characteristics, (4) Self-efficacy, and (5) Personal leadership skills. The level 2 was organizational level, had a dependent variable: Organizational climate which composed of 4 indicators namely (1) Principal leadership, (2) Organizational goals, (3) Decision-making structure, and (4) Information communication. In order to measure the latent variables, we used 3 questionnaires to collect data: (1) Leadership ability Self-assessment questionnaire, (2) Personal factor questionnaire, these two questionnaires to be filled out by art teachers in individual level; And (3) Organizational climate questionnaire, it was to be

filled out by administrators in organizational level. The instrument used questionnaire of Likert's rating scale with 5 scales.

Five steps in developing data collection instruments were, Step 1, Review related literature about the development of instruments, Step 2, operational defined of the construct and development items, and do the content validity by using the IOC method. Step 3 Item analysis and preparation of final drafts. Step 4 scale Try-out or pilot study. In the try-out or pilot study, the draft of questionnaire will be employed to 30 similar to samples, which were not selected as samples but have the same properties. The purpose were to scale reliability and discriminating power statistics calculation using the SPSS software. Step 5 the instrument modification, if the items with were not met the cutup criteria must be deleted from the questionnaire or modified and tryout again.

Data collection

Step 1: Requested permission to collect research data from the BTU Faculty of Education. And requested a letter of recommendation from a researcher at the BTU Faculty of Education.

Step 2: The Mini Program Questionnaire Star was selected as the data collection software for each institution. Upload the prepared questionnaire to Questionnaire Star and wait for it to be sent.

Step 3: Conducted data collection on selected samples, and sent questionnaires to the administrators at each university, and helped to collect data on the selected samples through the questionnaire star.

Step 4: Conducted data collection on selected samples, and sent questionnaires to the teachers at each university, and helped to collect data on the selected samples through the questionnaire star.

Data analysis

The researcher used descriptive statistics to interpret the sample data. The frequencies and the percent used to analyze the qualitative data such as data in nominal or ordinal scale. The Means and standard deviation were used to analyze the quantitative of observed variables. Data analysis for multilevel modeling was divided into 4 steps to answer the research question and hypotheses testing, each step used to parameter estimation and hypothesis testing.

The 4 four steps were (1) step 1, the Random intercept (or null model), In this model, we input only the dependent variable at the individual level without any independent variable at both the individual level and the organizational level and let the intercept be random. The purpose of this model was to find the amount of variance of art teachers' professional leadership that could be explained at the individual and organizational level as well as to find the intra-class correlation statistics. (2) step 2, the Random intercept and fix slope model, we put the independent variables both at the individual level and organizational level, letting the intercept be random and the slope fixed. The purpose of this model was to find the relationship between independent variables and dependent variables when controlling the contextual effects constant. (3) step 3, the Random intercept and Random slope model, we put the independent variable both in the individual level and organizational level, let the intercept and the slope both random. The purpose of the model was to find out whether the covariate at level 2 affects teacher professional leadership, after controlling for the covariate organizational climate at level 1 constant with random slope. And (4) the cross-level interaction model, the

purpose of this model was to find how is the independent variable at level 2 affected the relation between personal factors and art teachers' professional leadership.

Research Conceptual Framework

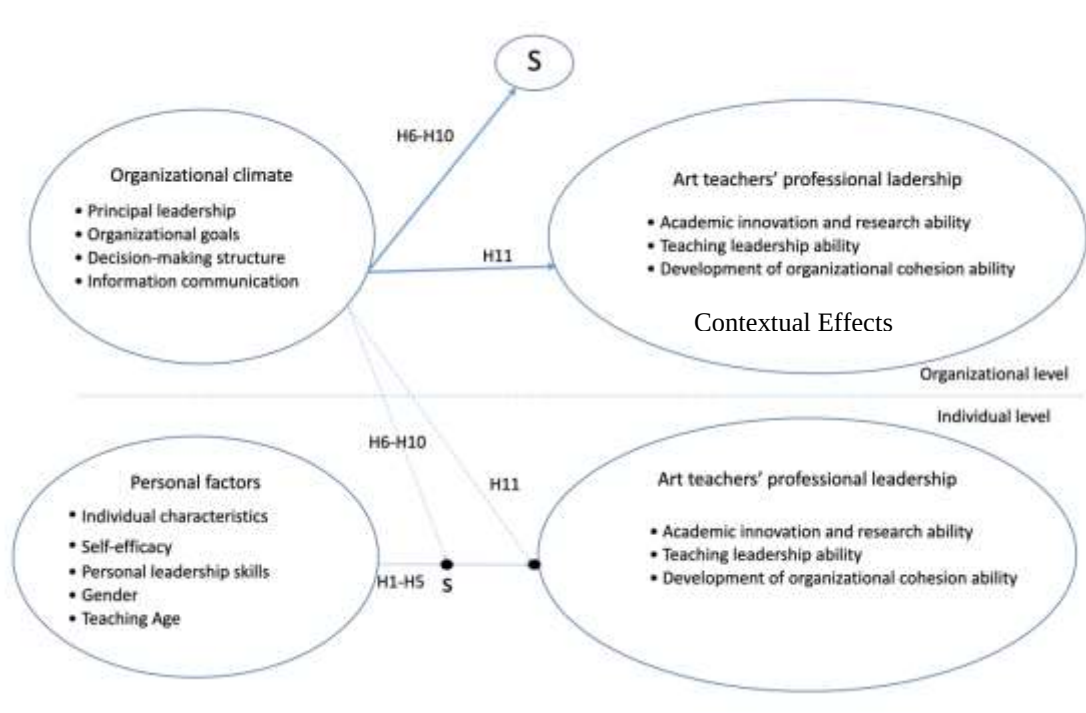


Figure1. Research Conceptual Framework

Research Results

Table 1. Summary research findings.

		model			
		Random intercept (step 1)	Random intercept and fix slope (Step 2)	Random intercept and random slope (Sep 3)	Cross-level interaction (Step 4)
parameters					
Level and Variables					
Individual level					
Fixed effects	Intercept (γ_{00})	3.26**	3.302**	3.290**	3.233**
	gender(γ_{10})		0.080	-0.010	0.068
	teaching-age(γ_{20})		0.178**	0.141	0.186**
	x1(γ_{30})		-0.355**	-0.349**	-0.191
	x2(γ_{40})		-0.004	-0.005	0.031
	x3(γ_{50})		-0.116	-0.113	-0.294
	Organizational level				
	w (γ_{01})		1.012**	1.008**	0.960**
	gender*w (γ_{11})				0.070
	teaching-age*w (γ_{12})				0.029
Random effects	x1*w (γ_{13})				0.489*
	x2*w (γ_{14})				0.090
	x3*w (γ_{15})				-0.487*
	Variance component				
	Within variance (σ^2)	0.311	0.046	0.043	0.026
	Intercept variance (τ_{00})	0.697	0.529	0.478	0.047
	Slope Variance (τ_{11})				0.513
	Intercept-slope covariance (τ_{01})				0.996
	Additional information				
	ICC	0.309	0.080	0.0832	0.049
Model evaluation	-2 log liketihood (FIML)	789.598	692.514	684.774	687.88
	No. of Estimated Parameters	3	9	10	15
	Psudo R ²	0.000	0.443	0.436	0.444

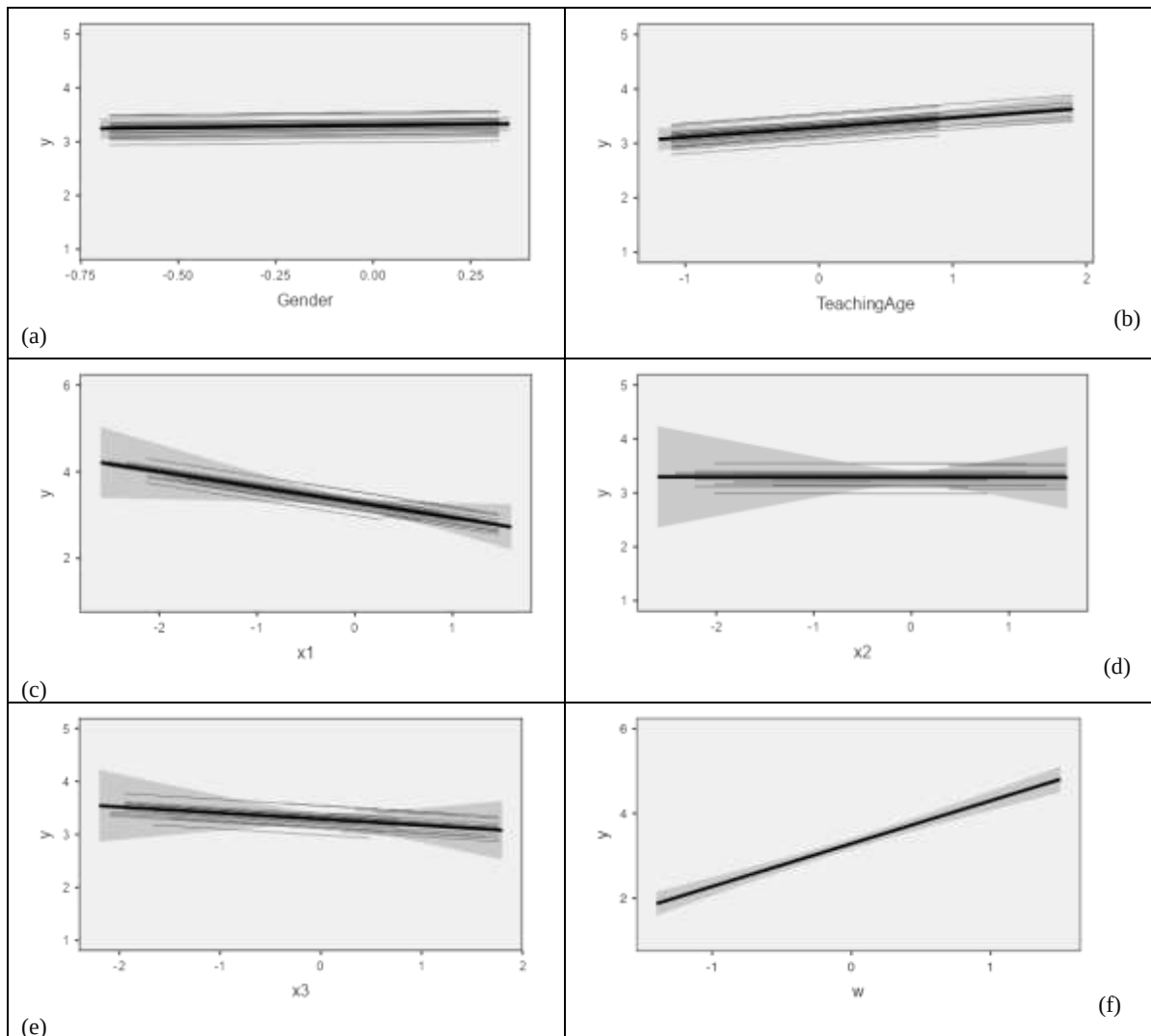


Figure 2 diagram showed the relationship between dependents variable and independent variables when fixed slope constant.

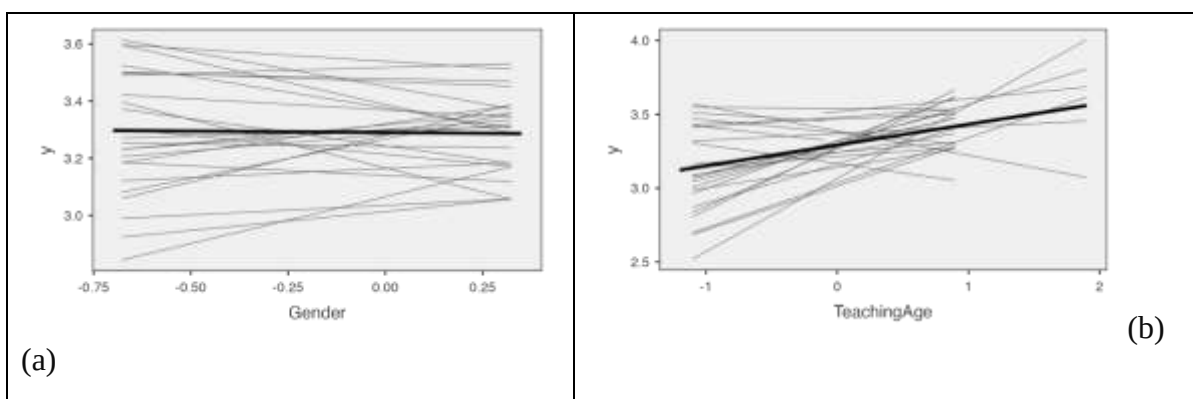


Figure 3 diagram showed the relationship between dependents variable and independent variables when were free as random.

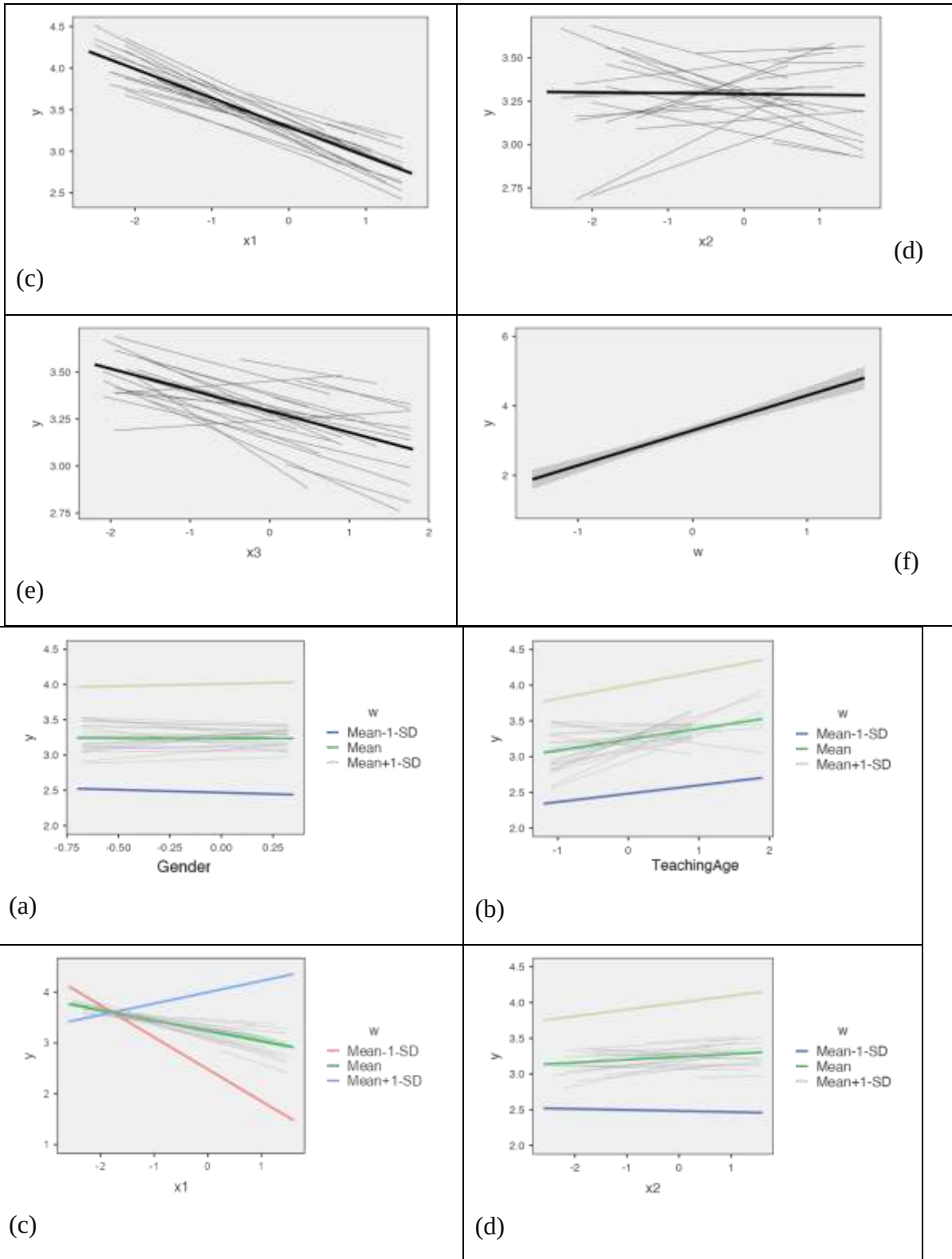




Figure 4 diagram showed the relationship between dependents variable and independent variables between different groups when were free as random.

Research Finding

1. The organizational contextual effects were affected Art teachers' professional leadership.

2. When fixed the effects of organizational climate on the relationship between personal factors and Art teacher professional leadership constant, there were positive effect of teaching-age, the negative effect of characteristics, and organizational climate on art teachers' professional leadership respectively, while the personal factors, gender, self-efficacy, and personal leadership skills, didn't affected art teachers' professional leadership.

3. When free the effects of organizational climate on the relationship between personal factors and Art teacher professional leadership to varied, there were a positive effect of characteristics and positive effect of organizational climate on art teachers' professional leadership, while the teaching-age, the personal factors, gender, self-efficacy, and personal leadership skills, didn't affected art teachers' professional leadership.

4. The cross-level interaction effects of organizational climate and personal factor, and organizational climate and personal leadership had effected the relationship between personal factor and art teacher professional leadership, but there had no interaction effect with gender, teaching-age, and self-efficacy.

Discussion

Regarding contextual effects, in the analysis of multi-level data, if there are independent variables at the individual level, regardless of whether the situational variables are influential or not, the situational variables are the research variables. Chinese scholars (Fang, Qiu, & Zhang, 2011: 284-292) combined multi-level (nested) data structures (taking two levels as an example), latent variables, and contextual effect analysis, and tested contextual effects with a multilevel structural equation model. (Qiu & Wen, 2007: 1-35; Zhang, 2010: 10-21) thought situational effect analysis should become a necessary procedure for multilevel data analysis. Finding in this study, there will be more contextual effects on the indicators of art teachers' professional leadership. There had 5 indicators of personal factors in this study, when controlling the organizational contextual effect constant and fixed slope, gender, x_2 = self-efficacy, x_3 = personal leadership skills, didn't affect art teachers'

professional leadership, teaching-age had a positive effect, and x_1 = characteristics had a negative effect on art teachers' professional leadership separately. About Gender, (Shangguan, 2014:1) sample analysis believes that different genders are significantly related to teacher leadership. (Ma & Gu, 2022: 28-31), based on the status quo and development strategies of teachers in new high-quality schools in Chengdu, they found that there is no significant difference in the overall level of teacher leadership in terms of gender. (Jiao, 2023: 111-117.) found that in scientific research ability, management, and communication ability, there are differences in the professional ability of teachers of different genders, but there are no significant differences in other dimensions. In this study, if you look at picture (a) of Figure 3, you could found that the slope of the mean was not statistically significant, but the slopes of some schools were negative and others were positive, the slope of every school was not the same, which showed that, overall, gender had no effect on arts teachers' professional leadership, but within individual schools, there were differences. Self-efficacy had the same situation. A more interesting finding is about teaching age, it was significant in step 2 but not in step 3, the difference between the two was that the slope of step 3 was random. By comparing picture (b) of the figure2 3, it was found that when we let the slope be random in Figure 3, the relationship between teaching-age and art teachers' professional leadership of every school doesn't the same, which had a positive relationship in some schools and a negative relationship in others, and because the positive was more than negative, so the comprehensive mean becomes positive but not significant. According to the sample analysis of (Shangguan, 2014:1), different ages are significantly related to teacher leadership. (Wang & Zappada, 2017: 77-83) believe that backbone teachers (the longer the teaching experience) have higher teacher leadership. (Jiao, 2023: 111-117.) found that teaching age is positively correlated with teaching ability and scientific research ability, and negatively correlated with sustainable development ability. The difference between this study and previous studies may be that more young teachers were included in this study, and the results may be different from the research with key teachers as the sample group.

In this study Organizational climate had no cross-level effect on the relationship between the teacher's gender, teaching age, x_2 = self-efficacy, and Art teachers' professional leadership. However, observed pictures (a), (b), and (d) in Figure 4, we found that in each specific school, gender, teaching age, and self-efficacy have an impact on the professional leadership of art teachers.

(Wang & Hong, 2011: 77-83)believed that a supportive organizational climate has a positive impact on employees' creativity through intrinsic motivation and psychological investment; (Frost & Harris, 2003: 479-498)who's study was concerned with the methods of developing leadership capacity among teachers, one of the important aspects of this study is interpersonal skill. According to them, the teacher's skills and personality could produce capable and confident leaders when interacting with the environment. (Wang & Zappada, 2017: 77-83)found through case analysis that although the interpersonal skills of backbone teachers are still lacking, different external factors——principal's empowerment, school cultural atmosphere, school system, etc. Facilitate or constrain teacher leadership. This result is also valid within the sample range of this study.

Organizational climate had cross-level effect on the relationship between the x_1 = characteristic, x_3 = personal leadership skills and Art teachers' professional leadership. In

Figure 4 pictures (c), and (e) showed the relationship between teacher's characteristics, and personal leadership skills on Art teachers' professional leadership, which were modulated by organizational climate (w) and were statistically significant. These data analyses showed the effect of characteristics on art teachers' professional leadership was negative in low, and medium organizational climates, and positive in high organizational climates. The effect of personal leadership skills on art teachers' professional leadership was negative in medium and high organizational climates, and positive in low organizational climates.

Recommendations

Recommendation for Policies Formulation

To sum up, when formulating policies, on the one hand, we need to increase the emphasis on organizational atmosphere, recognize the positive role of organizational climate, formulate relevant policies and measures to guide, and assist the government, school training, and improve the organizational climate of the school; On the other hand, we must also realize that each school has different characteristics, and under different organizational contextual effects, it is necessary to adopt different specific measures to help art teachers in colleges and universities improve their professional leadership.

Recommendation for Practical Application

Because we found the characteristics of teachers and personal leadership skills will be affected by the cross-level organizational climate. In different organizational climates, the slopes are different. so we recommendation:

- 1) In universities with better teacher characteristics, the professional leadership of art teachers can be cultivated by improving the organizational climate.
- 2) In universities with a high organizational climate, art teachers' professional leadership can be cultivated by cultivating and improving the characteristics of teachers.
- 3) When the organizational climate is low, the art teachers' professional leadership can be enhanced by training teachers' personal leadership skills.
- 4) Without considering the organizational climate, if we want to improve the art teachers' professional leadership by increasing teachers' teaching experience and cultivating teachers' self-efficacy, it needs to be determined according to the specific situation of each university.

Recommendation for Further Research

According to the Psudo R^2 in Table 1, showed that all independent variables jointly explained the proportion of the dependent variation about 44%, showed that there was more variations of Arts Teachers' Professional Leadership leave to be explained by other independent variables that were not included in model. Future research do research to find out those variables that can incorporate other sub-dimensions of organizational climate and more independent variables at the individual level into the analysis model.

Reference

- Dewey, J. (2005). *How we think*. Experience and Education. Beijing: People's Education Press.
- Duan, J., Wang, J., & Zhu, Y. (2014). Organizational climate: A review of conceptualization, theory and prospects. *Advances in Psychological Science*. 22 (12), 1964-1974. <https://doi.org/10.3724/SP.J.1042.2014.01964>
- Duan, Y. (2008). *Practical Research on Teachers' Professional Development*. Fuzhou: Lujiang Publishing House.
- Fang, J., Qiu, H., & Zhang, M. (2011). Analysis of Situation Effects Based on Multilevel Structural Equation Model-Comparison with Multilevel Linear Model. *Advances in Psychological Science*. 19 (2), 284-292.
- Frazier, M.L. (2009). *Voice climate in organizations: A group level examination of antecedents and performance outcomes* [Doctoral dissertation, Oklahoma State University].
- Frost, D., & Harris, A. (2003). Teacher leadership: Towards a research agenda. *Cambridge Journal of Education*. 33 (3), 479-498. <https://doi.org/10.1080/0305764032000122078>
- Hallinger, P. (1992). The evolving role of American principals: From managerial to instructional to transformational leaders. *Journal of Educational Administration*. 30 (3), 2-8. <https://doi.org/10.1108/09578239210014306>
- Jiao, X. (2023). An Empirical Study on the Professional Ability Development of Higher Vocational Teachers from the Perspective of High-Quality Development—Based on a Survey of 422 Teachers of Higher Vocational Colleges in Jiangsu. *Jiangsu Higher Education*. 1 (1), 111-117. <https://doi.org/10.13236/j.cnki.jshe.2023.01.016>
- Little, T.D., Bovaird, J.A., & Card, N.A. (2007). *Modeling contextual effects in longitudinal studies*. Mahwah, N.J: Lawrence Erlbaum Associates.
- Ma, L., & Gu, Y. (2022). Current status and development strategies of teacher leadership in new high-quality schools—Based on an empirical survey of 292 new high-quality schools in Chengdu. *Teacher Education Forum*. 35 (06), 28-31.
- Pan, X. (2014). *Research on School Organizational Climate*. Chongqing: Southwest Normal University Press.
- Qiu, H., & Wen, F. (2007). Hierarchical linear model analysis of context effect: Taking school organizational innovation atmosphere and teachers' creative performance as examples. *Education and Psychology Research (Taiwan)*. 30 (1), 1-35.
- Shangguan, D. (2014). *Research on Influencing Factors of Effective Realization of Teachers' Leadership in Colleges and Universities* [Master's dissertation, Yunnan Normal University].
- The CPC Central Committee and the State Council. (2018). *Opinions of the CPC Central Committee and The State Council on Comprehensively Deepening the Reform of Building Teachers in the New Era*. http://www.gov.cn/zhengce/2018-01/31/content_5262659.htm
- Wang, D., & Hong, Y. (2011). A Study on the Mechanism of Organizational Climate Impacts on Employee Creativity. *Journal of Zhejiang University (Humanities and Social Sciences)*. 41 (2), 77-83.
- Wang, F., & Zappada, S. (2017). An Empirical Study on Influencing Factors of Key Teacher Leadership. *Hunan Normal University Educational Science Journal*. 16 (03), 83-88. <https://doi.org/10.19503/j.cnki.1671-6124.2017.03.013>

- Xi, J. (2021). *General Secretary Xi Jinping's important treatises on teachers' ethics and styles*. http://www.moe.gov.cn/jyb_xwfb/moe_2082/2021/2021_zl37/2021shideshifenglunshu/202105/t20210511_530825.html
- Ying, D. I., & Ho, D. (2015). Developing preservice teachers as leaders: A case of early childhood education in Hong Kong. *International Teacher Education: Promising Pedagogies (Part B)*. 22 (1), 51-69. <https://doi.org/10.1108/S1479-368720150000025023>
- York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Review of Educational Research*. 74 (3), 255-316. <https://doi.org/10.3102/00346543074003255>
- Zhang, Z.X. (2010). Contextualization and multi-level theory in organizational psychology research. *Acta Psychologica Sinica*. 42 (1), 10-21.
- Zheng, Y. (1986). *The function and effectiveness of education*. Hong Kong: Wide Angle Mirror Press.