

# **Factors Affecting the Professional Leadership of Environmental Design Teachers in Public Universities in Guangdong Province**

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## **Abstracts**

The objectives of this research were: (1) to study factors affecting teachers' professional leadership, (2) to study the mediating effect of teachers' leadership on the relationship between factors and teachers' professional leadership (3) to test the relationship model fit to the empirical data.

Population in this research were teachers majoring in environmental design in public universities in Guangdong Province. Sample were selected by using stratified random sampling method, sample sized were 787 teachers majoring in environmental design in 21 of 38 public universities in Guangdong Province. According to the design of this study, a sample population of no less than 555 people was calculated using G\*Power.555 valid questionnaires were collected. Confirmatory factor analysis and structural equation model were used to analyze and statistical data.

The research finding showed that: (1) There were two main factors or second-order factors that affecting teachers' professional leadership, learning ability and teachers' leadership. Learning ability which were composed of 2 sub factors or first-order factors, teaching ability and scientific research ability. Teachers' leadership were composed of 2 sub-factors or first-order factors, personal characteristics, and organizational management ability. (2) Teachers' leadership had no mediating effects on the relationship between factors and teachers' professional leadership. (3) The relationship model fit well to the empirical data ( $\chi^2/df = 2.694$ , CFI = 0.985, TLI = 0.983, RMSEA = 0.055).

**Keywords:** Teacher Leadership; Professional Leadership; Environmental Design Teachers; Guangdong Province; Teaching Ability

## **Introduction**

At present, although the research on "teacher leadership" was increasing, most of the research results were focused on the review of the results of "teacher leadership" in the West and the definition and clarification of the concept of "teacher leadership". In recent years, "teacher leadership" had become increasingly popular in the field of teacher education. In the process of teacher leadership training, teachers' professional abilities have been developed and professional knowledge has been enriched. The development of each individual teacher is education opportunities for changes in the field. The attention to the professional development of teachers has never diminished. Whether each front-line teacher's professional development makes progress would directly affect the process of university education and university reform in China. The study of teacher leadership from the perspective of teacher professional development has important theoretical significance for the formulation of my country's

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education policy, the process of university reform, and the improvement of teachers' professional ability (Wang,2020).

The professional development of teachers runs through the career of every teacher, and it is a major problem that cannot be avoided in the development of teachers. The research and interpretation of teacher leadership from the perspective of professional development helps teachers establish a correct and noble "leadership view". Its practical value and theoretical significance were self-evident. Took teacher leadership as an opportunity to promote the professional development of teachers, so that every teacher can get a sense of happiness in his career, so as to promote the continuous development of the entire education industry. In actual teaching, most teachers were assuming the responsibility of "teaching leadership", but teachers do not link "leadership" with their own educational activities, and only introduce "teacher leadership" to promote the professional development of teachers. In the professional growth of teachers, "teacher leadership" can have real meaning for teachers (Wen,2011).

With the improvement of teacher leadership, it would help teachers to clarify their own position in university practice and teaching activities, constantly change their understanding of teachers' profession, and stimulate teachers' enthusiasm for work and sense of ownership.

The key to the reform of environmental design education lies in teachers. Improving the professional ability of environmental design teachers is the core of the teaching reform. The key to the development of university environmental design education is not in high-rise buildings, but in having first-class environmental design teachers and first-class teaching and research level. Only first-class environmental design teachers and other professional educators build first-class disciplines and shape the professional culture of the university can improve the overall quality of the environmental design education system and win the international voice in the field of environmental design education. The "National Medium and Long-term Educational Reform and Development Plan Outline" pointed out that teachers need to update the concept of talent training, innovate the talent training model, and reform the education quality evaluation and talent evaluation system. (China,2010). This not only gives a deeper connotation to the professional development of environmental design teachers, but also puts forward higher requirements for the professional development of teachers. However, facing the opportunities and challenges given to us by the era of globalization, were our environmental design teachers ready today?

## Research Objective(s)

The purposes (objectives) of this research were:

- (1) to study factors affecting teachers' professional leadership;
- (2) to study the mediating effect of teachers' leadership on the relationship between factors and teachers' professional leadership;
- (3) to test the relationship model fit to the empirical data.

## Research Methodology

This research took "teacher professional leadership" as the research perspective and adopted a quantitative research methodology design. The following methods were mainly used: literature research method, survey research method, quantitative analysis, analytic hierarchy process and other methods. On the basis of literature research, this paper constructed five factors that affect the professional leadership of environmental design teachers in universities. Dimensional model. In order to further understand the development status of environmental design teachers' professional leadership in Guangdong Province, and to provide a more realistic and realistic reference for promoting the development of teachers' professional leadership, A questionnaire survey was conducted on the current situation of the professional leadership development of environmental design teachers in public universities and the environmental factors that affect its development.

This research used SPSS26.0 and AMOS22.0 statistical software to analyzed the results of the questionnaire, and further verifies the model of influencing factors of professional leadership of environmental design teachers in public universities in Guangdong Province constructed through quantitative research. Through analysis and moderating effect analysis, the development status of environmental design teachers' professional leadership in public universities in Guangdong Province was understood, and the correlation between various elements is verified. This chapter was divided into the following sections: (a) Study Design, (b) Population and Sampling, (c) Instrument Development, (d) Data Collection, (e) Data Analysis and Interpretation, (f) Abstract.

The sample size was determined by used the multi-state random sampling method which sampled from the population in the academic year 2023, obtained by adopted the method of proportional stratified random sampling, with universities as stratum. According to the environment design profession where teachers were located and the colleges and universities, and then use a proportional simple random sampling to select samples from each cluster. 21 universities in Guangdong Province were randomly selected sampling method, totaling 787 Samples. Use the G\*Power software to set the following parameters to calculate the sample size: the effect amount  $w=0.30$ ,  $\alpha$  the error prob= $0.05$ , the degree of freedom= $155$ , and the chi square test obtained 0.80 statistical data, with a total number of samples of 547. The tool used for data collection was the questionnaire. 555 questionnaires have been received, and the response rate was 100%. The measurement model (CFA) and structural equation model (SEM) (CollierE.Joel., 2020)technique employed for data analysis and hypothesis testing.

## Research Scope

The research population of this article is mainly environmental design teachers in the University of Design of Public Undergraduate Universities in Guangdong Province. According to statistics, there were 38 public undergraduate universities in Guangdong Province, 27 of which have art and design colleges, and 21 of the 27 art and design colleges There were 787 environmental design teachers. The population scope of this study is the heads and teachers of environmental design majors in the design college of these 21 public universities.

The population in this study will be teachers who were teaching environmental design in public universities in Department of the University of Design conducted detailed research, Guangdong province in academic year 2023.

Samples was selected by used the proportional stratified random sampling technique with universities will be stratum, and the sample size will be 547 teachers. The time of this study will be an academic year 2022-2023.

## **Research Findings**

In the measurement model specification of this study, the researchers identified six factors, namely:

(1) Personality Characteristic (PC) include Dedication and integrity (DI), Example and demonstration (ED) and Treat people equally and help others grow (TEG);

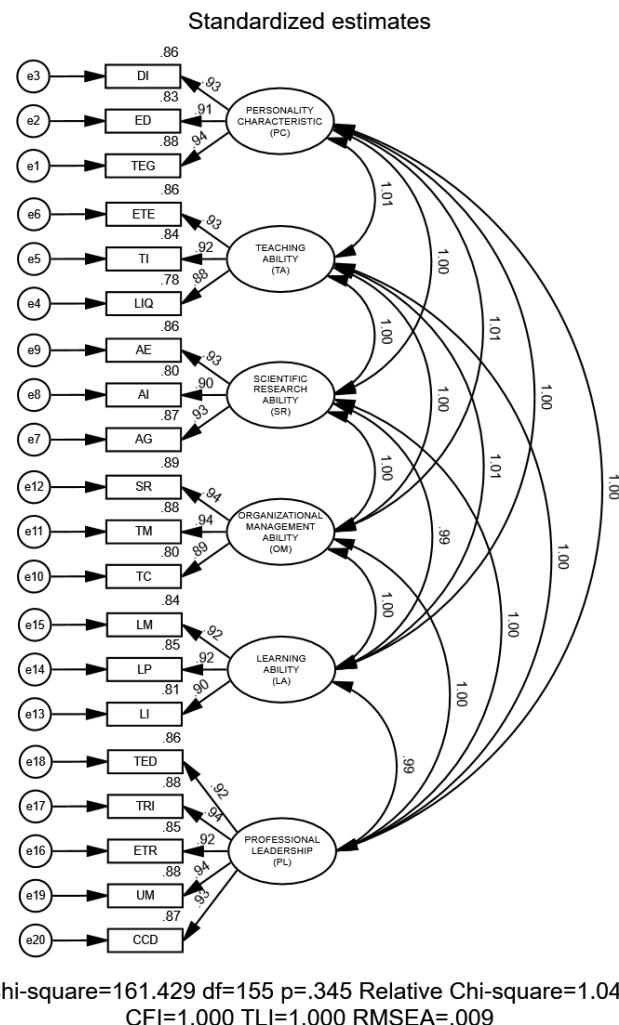
(2) Teaching Ability (TA) include Excellent teaching ability and experience (ETE), Teaching innovation (TI) and Lead others to improve the quality of teaching (LIQ);

(3) Scientific Research Ability (SR) include Academic enthusiasm (AE), Academic innovation (AI) and Academic guidance (AG);

(4) Organizational Management Ability (OM) include Sense of responsibility (SR), Team motivation (TM) and Team communication (TC);

(5) Learning Ability (LA) include Learning motivation (LM), Learning perseverance (LP) and Learning innovation (LI);

(6) Professional Leadership Ability (PL) include Teacher ethics demonstration (TED), Teaching reform and innovation (TRI), Educational teaching research (ETR), University management (UM) and Curriculum construction and development (CCD).



**Figure 1** Re-specifics Measurement Model (standardized estimates)

**Table 1** validity analysis, the composite reliability (CR), the average variance extracted (AVE) the maximum shared variance (MSV), the Maximum reliability (MaxR(H)), and the latent variables intercorrelation with square root of AVE at the diagonal.

	CR	AVE	MSV	MaxR(H)	PC	TA	SR	OM	LA	PL
PC	0.947	0.857	1.012	0.948	<b>0.926</b>					
TA	0.935	0.827	1.012	0.937		1.006***	<b>0.909</b>			
SR	0.943	0.846	1.008	0.945		0.995***	0.995***	<b>0.920</b>		
OM	0.946	0.854	1.012	0.950		1.006***	1.004***	1.004***	<b>0.924</b>	
LA	0.938	0.835	1.011	0.939		0.999***	1.006***	0.995***	1.000***	<b>0.914</b>
PL	0.97	0.867	1.000	0.971		1.000***	1.000***	0.997***	0.999***	0.994*** <b>0.931</b>

Data analysis from table 1 shown the  $\alpha$  value of each variable was greater than 0.8, the AVE value was greater than 0.5, and the CR value was greater than 0.7. It was proved that the CFA model has good reliability.

But in the table1.1 showed the MSV value was mainly observed. The MSV value of PC was 1.012>AVE value was 0.857, the MSV value of TA was 1.012>AVE value was 0.827, the MSV value of SR was 1.008>AVE value was 0.846, the MSV value of OM was 1.012>AVE value was 0.854, the MSV value of LA was 1.011>AVE value was 0.835, and the MSV value of PL was 1.0 and AVE value was 0.867. All MSV values were greater than AVE values, indicating poor discrimination validity. The relationship between modification factors needs to be considered.

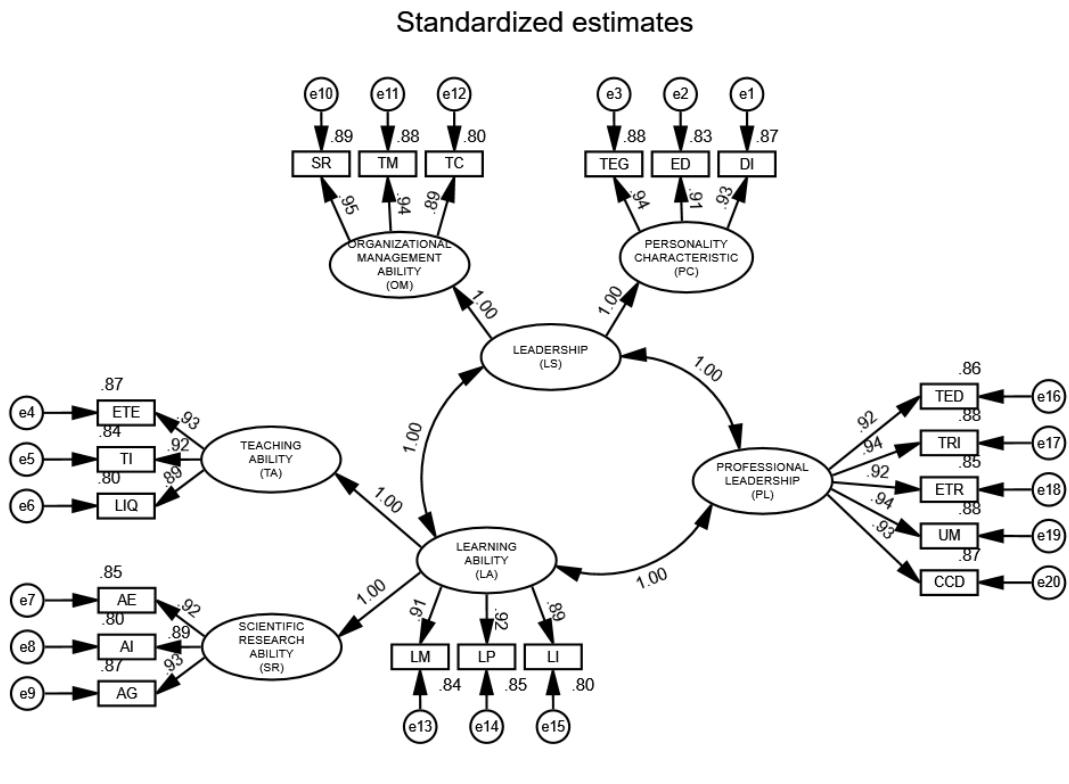
**Table 2** HTMT Analysis

	PC	TA	SR	OM	LA	PL
PC						
TA	1.007					
SR	0.955	0.994				
OM	1.008	1.006	1.005			
LA	0.998	1.006	0.994	1.001		
PL	1.000	1.001	0.996	1.000	0.994	

From Table 2, HTMT Warnings: PC and TA were nearly indistinguishable. PC and SR were nearly indistinguishable. TA and RS were nearly indistinguishable. PC and OM were nearly indistinguishable. SR and OM were nearly indistinguishable. PC and LA were nearly indistinguishable. TA and LA were nearly indistinguishable. SR and LA were nearly indistinguishable. OM and LA were nearly indistinguishable. PC and PL were nearly indistinguishable. TA and PL were nearly indistinguishable. SR and PL were nearly indistinguishable. OM and PL were nearly indistinguishable. LA and PL were nearly indistinguishable. If the HTMT value was less than 0.85 (sometimes 0.9 was used as the standard), the discriminative validity between the two factors was indicated. Otherwise, the discriminative validity of each factor was not obvious.

All of these three methods that were used to evaluate the discriminant validity' the Fornell & Larker criteria, the use of Maximum share variance, and the HTMT, all were pointed that the model was lack of discriminant validity, that means the all factors were highly correlated each other, and also pointed that the measurement model need to modify to eliminate the lack of discriminant validity.

How to solve the lack of discriminant validity was to combine constructs into one overall measure, into higher order (Hair, et al., 2014). Hence, in this study the research combined factor PC and OM to be first order factor, and LS as 2nd-order factor and also combined TA and SR to be 1st-order factor of LA as 2nd-order Factor. Then the researcher respecifies the factor leadership factor as dependent variable that could be explained by the independent variable LA.



Chi-square=187.416 df=168 p=.145 Relative Chi-square=1.116  
CFI=.999 TLI=.999 RMSEA=.014

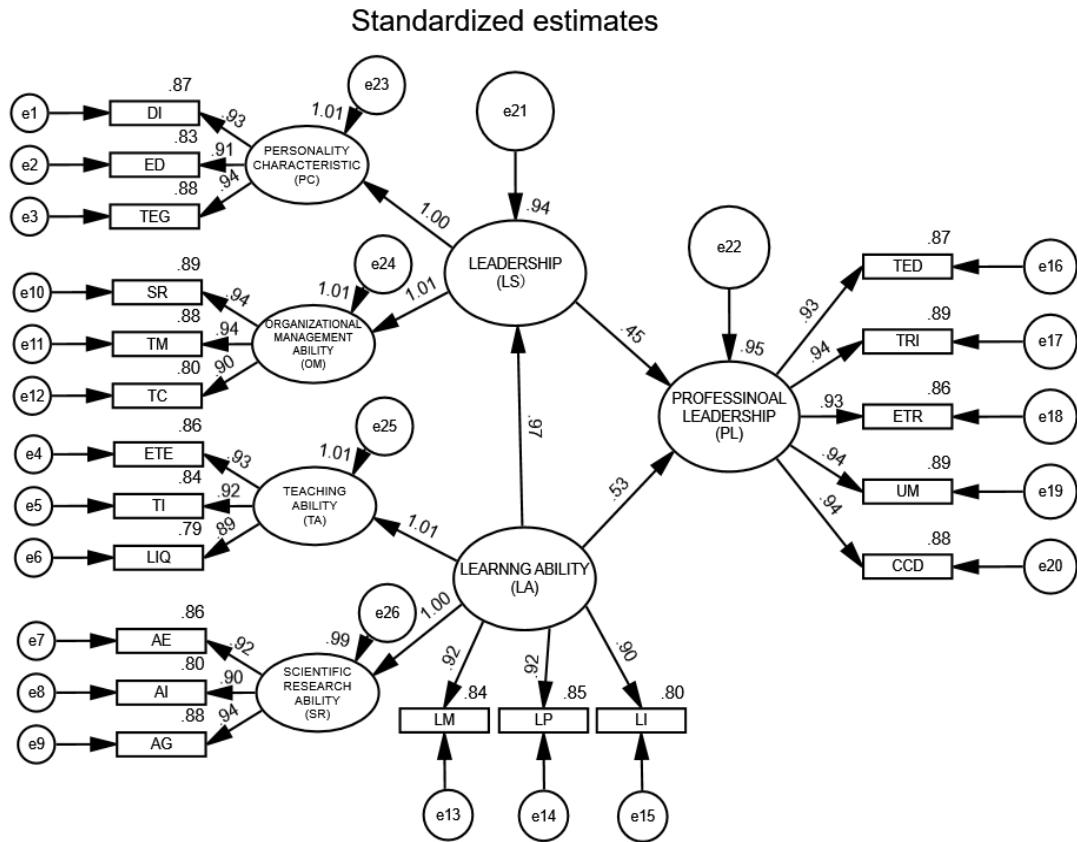
**Figure 2** Re-specifics Measurement Model (standardized estimates)

**Table 3** validity analysis, the composite reliability (CR), the average variance extracted (AVE) the maximum shared variance (MSV), the Maximum reliability (MaxR(H)), and the latent variables intercorrelation with square root of AVE at the diagonal.

	CR	AVE	MSV	MaxR(H)	LA	PL	LS
<b>LA</b>	1.000	1.000	1.004	1.000	<b>1.000</b>		
<b>PL</b>	0.970	0.867	0.999	0.971	1.000***	<b>0.931</b>	
<b>LS</b>	1.000	1.000	1.004	1.000	1.002***	0.998***	<b>1.000</b>

From Table 3, the MSV value is mainly observed. The MSV value of LA was 1.004 >AVE value was 1, the MSV value of PL is 0.999>AVE value was 0.867, and the MSV value of LS was 1.004 >AVE value was 1. From the MSV values of the above three dimensions, we can see that the discriminant validity of the scale data is very good. However, it is worth noting that the PL value in this group of data is 0.931, which is less than the previous value of 1, but it did not affect the discriminant validity.

The Structural Equation Model was a second-order model. In this study the research combined factor PC and OM to be first order factor, and LS as 2nd-order factor and also combined TA and SR to be 1st-order factor of LA as 2nd-order Factor. Then the researcher respecifies the factor leadership factor as dependent variable that could be explained by the independent variable LA. The Structural Equation Model showed as figure 3 and figure 4



**Figure 3** Structural Equation Model (standardized estimates)

From Figure 3, the formula of the model was  $PL=0.094 + 0.434*LA + 0.541*LS$ , and the Determination coefficient ( $R^2$ ) of the model was 0.952, which means that LA, LS can explain 95.2% of the variation of PL. It was found that the model passes the F test ( $F=5459.668$ ,  $p=0.000>0.05$ ), that was, at least one of LA, LS will have an impact on PL. The regression coefficient value of LS was  $0.541(t=13.754$ ,  $p=0.000>0.01$ ), meaning LS has a significant positive influence on PL. The regression coefficient of LA was  $0.434(t=11.008$ ,  $p=0.000>0.01$ ), which means that LA has a significant positive influence on PL.

The formula of the model was  $LS=0.092 + 0.974*LA$ , and the R-square value of the model was 0.945, which means that LA can explain 94.5% of the change of LS. The model passed the F test ( $F=9433.145$ ,  $p=0.000>0.05$ ), which means that LA must have an influence on LS. The final concrete analysis shows that:

The regression coefficient of LA was 0.974( $t=97.124$ ,  $p=0.000 > 0.01$ ), indicating that LA has a significant positive effect on LS

**Table 4** Hypothesis testing for Structural Equation model

Label	Description	Estimate	S.E.	P
<b>H1</b>	PL $\leftarrow$ LS	0.46	0.073	***
<b>H2</b>	PL $\leftarrow$ LA	0.566	0.076	***
<b>H3</b>	LS $\leftarrow$ LA	1.005	0.024	***
<b>IE1</b>	LA --> LS --> PL	-0.185	-0.185	0.620

Note: \*represents  $P \leq 0.05$ , \*\* represents  $P \leq 0.01$ , \*\*\*represents  $P \leq 0.001$ .

According to the data analysis in Table 4.3, hypothesis 1 was that Leadership (LS) has a positive impact on Professional Leadership (PL). In hypothesis testing, we usually observe the P value calculated according to the model, which was the result probability when the original hypothesis was true. The P value  $\leq 0.05$  statistically indicates that this hypothesis is valid. This table shows the P value, (p), which was less than 0.05, indicating that hypothesis 1 was valid.

This table shown hypothesis 2 was that Learning Ability (LA) has a positive impact on Professional Leadership (PL). the P value (p) was less than 0.05, indicating that hypothesis 2 was valid.

This table shown hypothesis 3 was that Learning Ability (LA) has a positive impact on Leadership (LS). the P value (p) was less than 0.05, indicating that hypothesis 3 was valid.

This table shown indirect effect 1, learning ability (LA) has a positive effect on professional leadership (PL) through leadership (LS). The P value (P) was greater than 0.05, indicating that the indirect effect was not significant.

## Discussion

The research shown that teacher leadership had a direct impact on the professional leadership of teachers in environmental design (Bass B. B., 1994). The researchers found in the study that, first of all, team communication was inferior to team responsibility and team motivation from the value of the three factors of organizational and management ability in leadership (Bryman, 1992). 10% of environmental design teachers believed that team communication was not enough in their leadership. 6% of environmental design teachers think that teacher leaders did not play their responsibility and motivate each other well. Secondly, from the value of the three factors of personality charm in leadership, 9% of environmental design teachers think that their leaders did not play a good role model and demonstration, but professional leaders should have dedication and integrity values. They were able to teach people as equals, as well as help other teachers grow. Finally, organizational and management ability and personality charm were important measures to measure leadership and professional leadership of teachers (Qiufang., 2007). It was also an important synergistic ability. After all, teacher professional leaders were engaged in leadership activities, which require certain organizational and management abilities, communication skills and personal charm to infect

and promote the development of other teachers and their profession (Bryman, 1992) (Gao, 2008).

The research shown that learning ability had a direct and significant impact on the professional leadership of environmental design teachers (mylie, 2004) (Zhang, 2018). The researchers found in the study that, first of all, from the value of the three factors of learning ability, learning motivation and learning perseverance can further improve the teaching ability and scientific research ability of professional leaders, and enhance their professional leadership. Learning innovation ability, scientific research innovation ability and teaching innovation need to be improved (Rao, 2019). Secondly, from the value of the three factors of teaching ability in learning ability, professional leaders had strong teaching ability and experience, and had their own opinions on teaching innovation, but they needed to improve the teaching quality of others. From the value of the three factors of research ability in learning ability, it could be seen that professional leaders could play a leading role in academia. They had high enthusiasm for academia, but academic innovation needs to be improved. Finally, there was no significant difference between formal teacher leaders and informal teacher leaders in terms of teaching ability and scientific research ability (Kuan, 2009). Both of them could promoted the development of their teaching and scientific research ability through their personal learning ability (Li J. , 2007).

The research shown that learning ability had a direct and significant impact on the leadership of environmental design teachers (Sergiovanni, 2003). Researchers found in the study that, first of all, the improvement of teaching ability and scientific research ability in learning ability could have a significant impact on the improvement of teachers' leadership (Peng, 2017). Secondly, learning ability had a significant impact on the personality charm in leadership, and learning ability also had a significant impact on the organizational management ability in leadership. This showed that the improvement of learning ability helped to improve their personality charm and organizational management ability (Li, 2016). Therefore, the characteristics of leaders could be reflected through their learning ability, teaching ability and scientific research ability (Gao, 2008).

## Recommendations

### 1. Recommendation for policy formulation development.

For universities, attracting, retaining and cultivating talents was a key issue to be solved. The key to keeping good teachers was to make universities collaborative workplaces. Teacher professional leaders will feel a higher sense of accomplishment and satisfaction when engaged in teaching and research activities (Ling, 2019). Universities should take important responsibilities in the development of teacher professional leadership. They should establish an incentive mechanism for the development of teacher professional leaders, provide intellectual support, material guarantee and time guarantee, and encourage teachers to participate in various training and implement professional leadership practices. Building a harmonious and favorable environment for university professional development was an important guarantee to improve teachers' professional leadership, and university culture was the key to the development of teachers' professional leadership (Tannenbaum, 1958). it was very important to provide a cultural environment for teachers to learn and develop mutually, and to create a working atmosphere of unity and collaboration. Positive university culture was the soil for the breeding of teachers' professional leadership. Teachers form teaching and scientific research teams, share professional power, discuss teaching ideas together, share

teaching experience, and support and encourage each other in scientific research (Yan, 2008). Universities should develop well-thought-out plans for teacher professional leadership development in order to produce sustainable results. A clear career development plan should include a series of work-linked learning and follow-up programs and mechanisms, such as mentoring, training, and organizing professional learning communities in a positive campus atmosphere to help teachers become professional leaders.

## **2. Recommendation for practical application**

Teacher professional leadership helps to improve teachers' communication and management skills. After becoming a professional leader, teachers gain more self-recognition and self-confidence, learn how to motivate and lead others, and learn how to communicate and deal with conflicts, thus improving their overall efficiency (al.etAchuan, 2010). The results of questionnaire survey on teacher professional leadership of environmental design show that although teacher professional leadership exists in educational practice, it was not well known. However, no teacher will be satisfied with his mediocre teaching and research achievements. We acknowledge that a small number of teachers do not have the solid professional knowledge and basic skills to improve their teaching effectiveness and enhance their professional competence. However, we found that more teachers can continue to learn, timely update their knowledge structure and teaching skills, strive to improve teaching efficiency, strive to improve their professional level, and strive to expand their influence in university reform through multiple channels. What we need to do was to find, recognize and arouse teachers who were active in these areas, and they were teachers who have the potential to develop as professional leaders. Recognizing formal or potential teacher professional leaders can set a positive example for other teachers as professional leaders (Basham, 2010).

## **3. Recommendation for Further Research**

In the process of education, teaching and academic research, teacher professional leaders exert influence on students, other teachers and the entire professional field through their personality charm, organizational and management ability, learning ability, teaching ability and scientific research ability (Peng, 2017). Teacher professional leaders mobilize the emotions of their followers, summon loyalty to the university's vision and shared values, and exercise influence. Even though most teacher professional leaders were not formal teacher leaders they also become role models for teachers and were recognized by other teachers. So how to cultivate teachers' professional leadership so as to effectively influence others?

### **(1) Develop equal and trusting interpersonal relations**

First of all, teacher professional leaders need to improve their teaching leading ability and drive others to improve their teaching effectiveness (Rao, 2019). Teacher professional leaders need to constantly learn advanced teaching concepts, combine with the current development of disciplines, and on the basis of careful analysis of the needs of society and students, set and develop clear and explicit teaching tasks and objectives, so that students and other teachers in the team can clearly understand the significance of teaching. Secondly, in order to prevent knowledge aging and ability degradation, teachers need to improve their learning ability, so as to change their educational concepts, update their educational thoughts, master cutting-edge information, broaden their knowledge field and improve their academic research ability. Teachers' professional leaders need to cultivate their own innovative thinking, actively promote teaching reform, improve teaching quality. Teacher professional leaders should stay in the forefront of teaching reform, not adhere to the old system in teaching methods, teaching content and teaching means, and constantly explore new ways of education

reform. Teacher professional leaders should also learn to create working and learning environments that support effective professional development, attach importance to the management of teaching resources, create interactive learning environments, and establish appropriate incentive systems (Moller., 2001).

**(2) Promote learning in oneself and in others**

First of all, teacher professional leaders need to improve their teaching leading ability and drive others to improve their teaching effectiveness (YouhuiHu., 2002). Teacher professional leaders need to constantly learn advanced teaching concepts, combine with the current development of disciplines, and on the basis of careful analysis of the needs of society and students, set and develop clear and explicit teaching tasks and objectives, so that students and other teachers in the team can clearly understand the significance of teaching. Teachers' professional leaders need to cultivate their own innovative thinking, actively promote teaching reform, improve teaching quality (mylie, 2004). Teacher professional leaders should stay in the forefront of teaching reform, not adhere to the old system in teaching methods, teaching content and teaching means, and constantly explore new ways of education reform.

**(3) Enhance teachers' self-confidence and sense of responsibility**

First of all, the confidence and sense of responsibility of teacher professional leaders can fully stimulate students' confidence in their own learning and learning perseverance. Secondly, the excellent professional quality of teachers improves students' trust in teachers and sets a good example for students to learn. Students directly realize that teachers are not only knowledge imparts, but also high-level professional leaders who are responsible for student development, which undoubtedly promotes students' academic progress. Teachers as professionals themselves have the professional decision of curriculum and teaching. Teachers should have leadership for students, curriculum and teaching, and academic research development. The emphasis on teachers' professional leadership is helpful to improve teaching practice and students' academic performance. Teachers being given the freedom to make professional decisions will help them better shoulder the responsibility for students' work (Sergiovanni, 2003).

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