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On the Scheme for Performance Management System of Private University Teachers Based on Competency

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Private universities are essential to higher education in China, and Guangdong is one of the country's most influential hubs for private higher education. Building a performance management system for teachers to enhance the overall level of the teaching workforce is a crucial measure to maintain competitive advantages for private universities. This study aims to enhance the understanding of constructing a teacher performance management system in private universities in Guangdong. Firstly, it examines the background and significance of this construction work in the context of Guangdong's private universities. Secondly, it reviews research on teacher competencies and performance management in higher education institutions. Furthermore, it comprehensively designs six research steps, including analysis of the current status of teacher performance management, development of a teacher competency model, empirical validation of the competency model, survey analysis of competencies, construction of a performance management framework, and practical implementation of the teacher performance management system. Finally, the potential social benefits that this research may bring about are summarized. The specific plan proposed in this study aims to serve as a valuable reference for organizations and individuals involved in developing teacher performance management systems in private universities. Additionally, it strives to positively enhance the overall competitiveness of private universities in Guangdong.

Keywords: Private universities, teacher competency, teacher performance management, construction scheme.

1. Introduction

With the acceleration of China's social and economic development process, social progress and economic development have changed from simple labor force export and resource consumption to scientific and technological innovation and intellectual property rights. As a unique academic community organization, colleges and universities are the connection point of talent training, scientific research and social service, and they shoulder the essential historical responsibilities of high-quality, innovative talent training, original, innovative research, scientific research and development, and the transformation and industrialization of scientific and technological achievements. Private universities are an essential part of China's higher education. As high-quality talent training organizations, they shoulder social responsibilities such as talent training and production capacity transformation. According to statistics from the Ministry [of Education of the People's Republic of China (2021)], by September 2021, there were 3,012 universities in China, with more than 1,913,800 full-time teachers, including 764 private universities and 369,600 full-time teachers. Guangdong is a solid economic province in China and a significant education province. The number of private universities and students is among the top in China. Guangdong is one of China's most influential and competitive private higher education clusters. Private universities train more than 32% of the talents exported by Guangdong.

Teachers, as the primary resource of universities, especially those with outstanding competence and excellent performance, directly impact the quality of talent cultivation. Private universities worldwide, including the United States (2005), commonly face the challenge of lower competitiveness compared to public universities, with the overall quality of their teaching staff being one of the core factors that hinder their competitiveness [Park (2005)]. With the development of China's economic and higher education reforms (2022), the construction of univer-

sity teaching staff has entered a new phase, shifting from quantity-oriented expansion to quality-oriented development [Li (2022)]. For private universities, researching teacher competency and constructing a teacher performance management system based on the competency model provides a feasible solution to enhance the overall level of their teaching staff. This is a fundamental requirement for implementing national policies and a rational choice for pursuing their own development.

2. Literature review

2.1. *Research on the competency of university teachers*

Professor [McClelland (1973)] published an article titled "Testing for Competency Rather Than Intelligence" in the journal Psychologist, which became the symbol of the "competency movement". With the gradual warming of competency research, its research field gradually extends from management to education. Between 1970 and 2000, the United States and the United Kingdom successively conducted research on the competence of educational administrators such as principals and provosts. After the end of the 20th century, the study of competence in education has gradually shifted from focusing on educational administrators to teachers. [Kelchtermans and Vandenberghe (1994)] has thoroughly studied teachers 'professional competence. He believes that teachers' professional competence comprises six parts: self-intention, self-respect, work motivation, work satisfaction, task perception, and prospects. [Olson and Wyett (2000)] and others believe that teachers are chosen not only because of their special educational qualifications but also because of their personalities and characteristics. China's focus on competency began with the introduction and promotion of Western educational learning theories at the end of the 20th century. [Wang and Chen (2002)] believes that the characteristics of competency include knowledge, skills, ability, values, personality, motivation, etc. [Peng (2011)] believes that competency is a collection of predictable and measurable sets of various personality traits that drive employees to produce excellent job performance. [Zhang and Xiao (2004)] believe that competence is the individual characteristics conducive to practical work in a specific organizational environment, cultural atmosphere and work, as well as the behavioral characteristics that can be predicted and affect performance. At the end of the 20th century, China began to explore the teachers 'competence, from the initial theoretical exploration to empirical research, from constructing a general competency model to studying teachers' specific competency. [Lan (1998)] When introducing the new trend of British teacher training, he mentioned the relevant requirements of British teacher training for the competence of regular university students. [Cai (2001)] By analyzing the research data, he classified the evaluation of teachers in China and proposed three different types of teacher evaluation, one of which is the evaluation of teacher competence. [Hao (2015)] Based on the interview of famous teachers and literature analysis, he designed a theoretical model of teaching competence composed of academic support ability, teaching transformation ability and teachers' personality attitude. [He and Zhao (2018)] system carried out a survey and thinking on the teaching competence of university teachers and carried out large-scale empirical research on the teaching competence of 13 universities in Jiangxi Province, such as Nanchang University.

2.2. *Research on the performance management of university teachers*

Performance management originated in Western countries, the definition of work performance connotation, scholars generally believe that [Spencer et al. (1994)] performance is neither the result of output nor performance behavior, but the individual has deep and inherent potential characteristics. It is related to work and can predict or affect work behavior and performance. With the rise of the "new public administration movement" in the world, it has gradually been widely adopted by public administration departments and has had a profound impact on higher education worldwide. Performance management of university teachers refers to the circulatory system guided by the organizational goals set by colleges and universities. Compared with the research on the work perfor-

mance of employees organized by enterprises, the research on the work performance of university teachers lags. Its theoretical achievements mainly come from the field of human resource management. The number and level of research results are not as good as the work performance of employees organized by enterprises. [Lally and Myhill (1994)] Combined with the purpose of evaluation and the effectiveness of teachers, it proposes that teachers 'values, teaching and scientific research can be used as the content of teachers' work performance evaluation, and these contents are comprehensively designed to form an evaluation standard.M. B, Paulsen and K. A, Feldman and other scholars [Paulsen and Feldman (1995)] proposed that the work performance dimensions of university teachers should include four aspects: teaching, service, research and graduate training, and academic citizenship. [Wolansky (2001)] pointed out that the performance evaluation of university teachers should include four aspects: assignment, service, academic professional participation and academic activities and professional development.

Since entering the 21st century, performance management has also become the leading concept and directional action strategy in China's higher education field. Under the guidance of the policy, many colleges and universities have explored the reform work based on performance management and established incentive and restraint mechanisms to improve the efficiency of school running. In the early days, [Xu and Wang (1991)] discussed university teachers' work performance evaluation methods. They introduced the fuzzy mathematical viewpoint and methodology into evaluating teachers' work performance, resulting in successful implementation. They also explained how fuzzy performance evaluation can be effectively applied. Professor [Zhang (2000)] believes that the purpose of formulating teacher performance evaluation indicators is to guide teachers in order to respond to the policies and needs of schools and the state, to consciously incorporate personal expectations into the process of school or national goals, and to make clear that personal goals should be unified with the organizational strategy. [Hu and Mo (2004)] In-depth investigation of full-time teachers in eight universities in Zhejiang Province proposed significant differences in individual characteristics in work values and task performance, and teachers' work values significantly influence their task performance. [Ding (2013)] confirmed the quality, innovation, and learning performance through exploratory factor analysis. [Jia et al. (2017)] believe that there are three main dimensions of research university teachers' work performance: work behavior, performance, and various output results included in the unit performance evaluation.

In conclusion, the research on the performance management of teachers in private universities based on teacher competence is still in the exploratory stage, and it is not easy to find the research. On the other hand, the specific research of teachers in private universities is rare. In short, the critical issues involved in the performance management of teachers in private universities are in-depth systematic research results are rare, the specific research method is relatively single, and the guidance of appropriate theory is lacking. It is an innovative research topic to take the teachers of private universities, construct the professional competency model of the private universities, conduct the empirical test with the research object, and study and construct the performance management system of the teachers through in-depth investigation and analysis.

3. Construction scheme of the performance management system

Building the performance management system for teachers in private universities based on their competence is a complex task. The design of these steps can be divided into six stages, as shown in Figure 1.

3.1. *Analysis of the current status of performance management for private university teachers*

Analyze the current situation of performance management of teachers in private universities in the new period, summarize the problems and analyze the reasons.

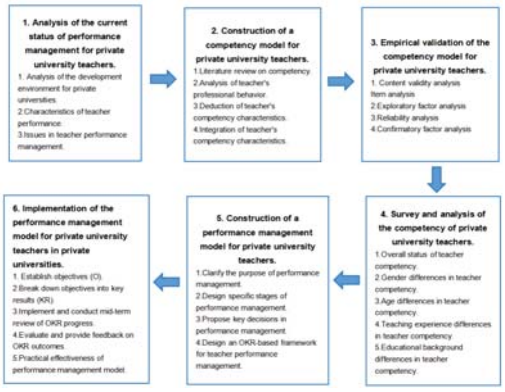

Fig. 1. Conceptual diagram for the construction of a competency-based performance management system for private university teachers.

3.2. *Construction of a competency model for private university teachers*

The literature analysis method is used to build a model of teachers 'competence in private colleges and universities, which specifically analyzes the process mechanism of university teachers' learning, teaching, scientific research and social service, reason and deduce the elements of teachers' competency, integrate the components of competence, and then construct a model of teacher competence.

3.3. *Empirical validation of the competency model for private university teachers*

The empirical test of the competent quality model of teachers in private colleges and universities. Based on the initial model, the "competency questionnaire of teachers in private universities in Guangdong Province" was compiled to test the reliability and validity of the questionnaire. The software SPSS26.0 and Amos24.0 were used to conduct statistical analysis of the data collected from the questionnaire. SPSS26.0 conducts descriptive statistics, project analysis, exploratory factor analysis, reliability analysis; Amos24.0 mainly conducts confirmatory factor analysis and model fit tests. This part of the work is to prepare an effective measurement tool for investigating teachers' competence in private universities.

In this study, it is crucial to have good validity and discrimination of the survey questionnaire. In specific research, content validity can be determined by examining the Item-Content Validity Index (I-CVI) of the "Competence Survey for Private University Teachers in Guangdong" questionnaire. Items with an I-CVI value lower than 0.7 should be deleted.

The Item-level Content Validity Index (I-CVI) is a measure used to assess the content validity of questionnaires or measurement tools. Its calculation formula is as follows:

$$\mathrm{I-CVI} = \frac{\sum_{\mathrm{i=k}}^{\mathrm{m}} \mathrm{N_i}}{\sum_{\mathrm{i=1}}^{\mathrm{m}} \mathrm{N_i}}$$

The "m" is the number of rating scale options for the items.

The "k" is the number of experts who agreed on a certain item's score.

The "" is the number of experts who selected the i-th rating option.

For example, in Table 1, for the first item, with a 5-point rating scale (ranging from 1 to 5), if there were 21 experts evaluating the item and the number of experts scoring 1, 2, 3, 4, and 5 were 1, 3, 6, 8, and 3 respectively, then the I-CVI value for that item would be:

$$\begin{aligned}
\mathrm{I-CVI} &= \frac{\sum_{\mathrm{i=k}}^{\mathrm{m}} \mathrm{N_i}}{\sum_{\mathrm{i=1}}^{\mathrm{m}} \mathrm{N_i}} = \frac{\sum_{\mathrm{i=3}}^{5} \mathrm{N_i}}{\sum_{\mathrm{i=1}}^{5} \mathrm{N_i}} \\
&= \frac{\mathrm{N_3 + N_4 + N_5}}{\mathrm{N_1 + N_2 + N_3 + N_4 + N_5}} \\
&= \frac{6+8+3}{1+3+6+8+3} \\
&= \frac{17}{21} \\
&= 0.81
\end{aligned}$$

The summarized results of I-CVI for the remaining items are shown in Table 1. The I-CVI values range from 0 to 1, indicating the level of agreement among experts for each item. Typically, an I-CVI value of 0.78 or higher indicates a high content validity for the item. It is important to note that I-CVI is an index of content validity for individual items and not an assessment of content validity for the entire questionnaire or measurement tool.

Table 1. Question Items of Competence Survey for Guangdong University Teachers and their I-CVI Values

Item		Dimension	I-CVI	Result
1	I am aware of the ways and channels for finding information in my professional field.	Professionalism	0.81	Retain
2	I can proficiently apply professional theories in my discipline.	Professionalism	1	Retain
3	When dealing with difficult problems, it is important for me to identify the root causes effectively.	Critical Thinking	0.91	Retain
4	I don't feel the need to pursue logic too much in work and life.	Critical Thinking	0.62	Delete
5	I believe that being a private university teacher entails significant social responsibility.	Career Identity	1	Retain
6	Sometimes, there is no difference between doing a good or bad job in terms of consequences, but I will always try my best to do a good job.	Career Identity	0.67	Delete
7	I often try to think from the perspective of my colleagues.	Collaboration	0.83	Retain
8	I find it meaningful to share experiences and tips with colleagues.	Collaboration	0.94	Retain
9	I am enthusiastic about classroom teaching reform, and my research work has achieved significant results.	Innovative Research	1	Retain
10	I am confident in my abilities for personal research work.	Innovative Research	0.94	Retain

Ensuring the discrimination of the items and deleting those that lack discrimination is extremely necessary. In this study, the extreme group comparison method can be used to determine the discrimination. The specific procedure involves calculating the total scores for each dimension based on the questionnaire data. Participants with total scores in the top 25% are defined as the high-score group, while those with total scores in the bottom 25% are defined as the low-score group. Finally, an independent sample t-test is conducted on the scores of each item between the two groups. If there is a significant difference in scores between the high and low-score groups, it indicates discrimination and should be retained. Conversely, if there is no significant difference in scores between the high and low-score groups, it implies a lack of discrimination and should be deleted. For example, the analysis data in Table 2 show clear discrimination for several items, indicating they should be retained.

The t-test for Equality of Means is a statistical method used to compare whether the means of two samples are significantly different. The calculation of the t-test for Equality of Means involves the following steps:

(1) Calculate the means ($\overline{X_1}$and$\overline{X_2}$) and standard deviations (S_1andS_2) of the two samples.

(2) Determine the observed sample sizes ($n_1$andn_2), which represent the number of observations in each group.

(3) Calculate the standard error (SE_1andSE_2) for each sample using the following formula:

$$SE_1 = \frac{S_1}{\sqrt{n_1}}$$

$$SE_2 = \frac{S_2}{\sqrt{n_2}}$$

(4) Calculate the degrees of freedom (df) using the following formula:

$$df_1 = n_1 + n_2 - 2$$

$$\mathrm{df}_2 = \frac{\left(\frac{{S_1}^2}{n_1} + \frac{{S_2}^2}{n_2}\right)^2}{\frac{\left(\frac{{S_1}^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2 - 1}}$$

(5) Calculate the pooled standard error (SE) using the following formula:

$$SE = \sqrt{\frac{SE_1^2 + SE_2^2}{2}}$$

(6) Calculate the test statistic (t-value) using the following formula:

$$t = \frac{\overline{X_1} + \overline{X_2}}{SE}$$

(7) Calculate the probability of the two-tailed distribution using the degrees of freedom and the test statistic. The two-tailed probability is the sum of the area greater than or equal to the test statistic value and the area less than or equal to the negative value, i.e.,P(T$\geq$ $|t|$)+P(T$\leq$ $-|t|$), where T follows a distribution with degrees of freedom df.

(8) Divide the two-tailed probability by 2 to obtain the p-value for the t-test for Equality of Means. This is because the t-test for Equality of Means is typically a two-tailed test, so we are only interested in the areas on both sides of the distribution curve.

(9) Compare the calculated p-value with the pre-set significance level (usually 0.05 or 0.01). If the p-value is smaller than the significance level,

reject the null hypothesis and conclude that there is a significant difference between the means of the two samples. Conversely, if the p-value is greater than or equal to the significance level, fail to reject the null hypothesis, indicating that there is insufficient evidence to conclude that the means of the two samples are different.

In the given context,$\overline{X_1}$and $\overline{X_2}$represent the mean of two samples,$S_1$and S_1 represent the standard deviation of two samples, andn_1 and n_2 represent the respective number of observations of the two samples.

The survey collected data from 606 samples. The data was sorted in descending order based on scores, with the top 25% considered as the high score group and the bottom 25% as the low score group. The data was then imported into SPSS, and the calculation results are presented in Table 2.

Table 2. Sample Analysis Table for the Survey Items on Competence of Private University Teachers

Item	Independent Samples t-test			H&L	number of cases	Mean	Standard Deviation
	t	Degrees of Freedom	p				
1	-22.47	301	0.000	1	152	3.42	0.745
		247.21	0.000	2	151	4.54	0.446
2	-21.86	301	0.000	1	152	3.67	0.749
		244.44	0.000	2	151	4.76	0.440
3	-23.19	301	0.000	1	152	3.17	0.759
		279.04	0.000	2	151	4.43	0.565
4	-23.15	301	0.000	1	152	3.58	0.699
		268.88	0.000	2	151	4.71	0.484
5	-28.83	301	0.000	1	152	3.56	0.712
		218.87	0.000	2	151	4.87	0.346

According to the table, Group 1 represents the low score group, while Group 2 represents the high score group. The average scores of most items in the high score group are greater than 4.4, while the average scores of the low score group are all below 3.7. The standard deviations of the high score group for each item are mostly lower than those of the low score group. This indicates that there is not much variation in the scores of each item within the high score group, whereas there is comparatively larger variation in the scores of each item within the low score group.The differences in average scores between the high score group and the low score group for each item are statistically significant, with p-values smaller than 0.001. This indicates that the differences are highly significant and suggests that all items should be retained.

3.4. *Survey and analysis of the competency of private university teachers*

Investigate the present situation of university teachers 'competence based on the teachers' competence model for scientific revision and validation, according to the model design and prepare the private college teachers 'competence questionnaire. Using the questionnaire, understand the present situation of college teachers' competence, combining the interview method with an in-depth analysis of the root of university teachers' competence development problems. This part of the work provides data support of index dimension and weight for establishing a performance management model.

In specific research work, it is important to focus on determining the current situation of first-level indicators (competence in each dimension) and second-level indicators (competency traits) of private university teachers in Guangdong. For instance, by conducting on-site investigations, the research can determine that "Innovative Research" and "Critical Thinking" are the dimensions that lower the overall competency level of teachers. These two dimensions should receive special attention when formulating the primary indicators for teacher performance management.

Table 3. Indicators of Competence Status for Private University Teachers

Dimension	Minimum Value	Maximum Value	Average Value	Standard Deviation
Professionalism	1.00	5.00	4.01	0.543
Critical Thinking	1.00	5.00	3.89	0.521
Career Identity	1.00	5.00	4.11	0.581
Collaboration	1.00	5.00	4.10	0.623
Innovative Research	1.00	5.00	3.98	0.508

3.5. *Construction of a performance management model for private university teachers*

According to the performance management characteristics of private universities and their teachers, appropriate performance management tools (OKR) are selected to build a performance management model. From standing on the height of the development strategy of private colleges and universities, starting from the actual teaching

management efficiency demand, and focus on the reality of teachers 'own development, hierarchical design teachers' performance management target, according to the private college teachers work actual design performance management main link, combined with the characteristics of the private college teachers performance indicators to determine the critical performance management decision.

3.6. *Implementation of the performance management model for private university teachers in private universities*

Based on the competence model and OKR performance management model, the survey results on the current status of competency of university teachers are analyzed. The study aims to determine the hierarchical indicators and their corresponding weights for the performance management system of private university teachers. It also proposes a path for implementing this performance management system, taking into account the specific characteristics of different private universities. The goal is to enhance the operability of research work.

4. Summary

Research on the performance management of teachers in Guangdong private colleges and universities based on teachers' competence is conducive to improving the education and teaching quality in private colleges and universities. This research can promote establishing a scientific and practical teacher performance management system in private colleges and universities and help improve teachers 'work performance and teaching quality through the comprehensive evaluation of teachers' professional competence. This will further improve the quality of education and provide students with a better learning experience and knowledge transmission.

The research on the performance management of teachers in private colleges and universities in Guangdong based on teachers' competence is conducive to optimizing the selection and training of teachers in private colleges and universities. The teacher performance management system based on the competency model is helpful in accurately evaluating the teachers' ability and quality and effectively selecting the teachers with excellent professional competence. At the same time, the research results can also guide teacher training and help teachers develop the necessary professional skills and knowledge in different fields.

The research on teacher performance management of Guangdong private universities based on teacher competency is conducive to optimizing the resource allocation of private universities. Through the effective teacher performance management system, the school can better understand and evaluate the teachers' work performance and make reasonable resource allocations accordingly. This will help schools optimize teachers' composition and allocation so all subject areas can receive appropriate support and development.

To conduct research on teachers' performance management in private universities in Guangdong based on teachers' competence is conducive to teachers establishing a sense of comprehensive development. It can motivate teachers to participate in professional development activities actively. Through clear evaluation criteria and performance objectives, teachers will pay more attention to their overall development and learning needs and actively participate in relevant training and academic exchanges to improve their comprehensive professional quality and ability.

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