

Development of Teacher Competency Model for Private Applied Universities in Guangdong Province

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ABSTRACT

Faced with the transformation and development of the new era and the cultivation of applied talents, the teacher competency in private applied universities in Guangdong Province is facing severe tests. The objectives of this research were to 1) study the level of teacher competency for private applied universities in Guangdong Province, 2) study the CFA of teacher competency for private applied universities in Guangdong Province, and 3) propose the development of teacher competency model for private applied universities in Guangdong Province. The sample consisted of 507 administrators and teachers. The research instruments were questionnaires and semi-structured questionnaires of in-depth interviews. Statistics used in data analysis include frequency, percentage, mean, standard deviation, confirmatory factor analysis and the content analysis by educational administration experts. The research results found that the overall level of the competency of teachers was at high levels. The confirmatory factor analysis and the content analysis of in-depth interviews revealed that the teacher competency model for private applied universities consists of 8 important factors: 1) professional knowledge, 2) teaching ability, 3) practical ability, 4) research ability, 5) self-development ability, 6) collaboration and communication ability, 7) professional values, and 8) personal trait. All 8 factors can be applied to develop the competency of teachers in the present and the future sustainably.

Keywords : Competency Model, Teacher competency, Private applied universities

1. Introduction

Guangdong is a strong province in China's economy and a major province in education. The number of private universities and their student population rank among the top in the country, making it one of the most influential and competitive gathering places for private higher education in China. At present, there are 23 private undergraduate universities in Guangdong Province and these universities have all chosen the positioning of applied universities, and improving the quality of applied talent cultivation is the core task of their development.

Faced with the transformation and development of the new era and the cultivation of applied talents, the teacher competency in private applied universities in Guangdong Province is facing severe tests. The construction of applied universities has put forward new and higher requirements for university teachers in teaching, research, social services, and other aspects. The role expectations of leaders in innovation and entrepreneurship education, implementers of smart education, cultivators of digital citizens, creators of original knowledge, and promoters of the transformation of patented technological achievements, which are not included in the traditional teacher view, quietly deepen and expand the main content of the competency of university teachers (Li, 2021).

This study aimed to scientifically and effectively evaluate the level of teacher competency in applied universities in Guangdong Province, to study a teacher competency development model that is in line with the characteristics of private applied universities in Guangdong Province. It used the CFA method to confirm the effectiveness and reliability of the model. Therefore, quantitative data was subsequently generated, providing reference indicators for the construction of the teaching staff and the development of relevant guidelines in universities.

2. Research Objectives

1. To study the level of teacher competency of private applied universities in Guangdong Province.
2. To study the CFA of teacher competency for private applied universities in Guangdong Province.
3. To propose the development of teacher competency model for private applied universities in Guangdong Province.

3. Scope of the Research

1. Population Scope

The population scope of this study included teachers and administrators from 23 private applied universities in Guangdong Province in 2024. This study selected sample from 21 private applied universities. The researchers selected 507 (Comrey & Lee, 1992) teachers and administrators as respondents through stratified sampling. The key informants were selected through purposive sampling, with a total of 9 teachers and administrators in applied universities.

2. Variable Scope

By analyzing the current research status and reviewing relevant literature and documents on the teacher competency model in applied universities, the author summarized and identified the variables of this study: 1) Endogenous variable: teacher competency for private applied universities. 2) Exogenous variables: Professional Knowledge (PK), Teaching Ability (TA), Practical Ability (PA), Research Ability (RA), Self-Development Ability (SDA), Collaboration and Communication Ability (CCA), Professional Values (PV), and Personal Trait (PT).

4. Research Methodology

1. Research Methodology

A qualitative and quantitative study was conducted on teacher competency. This study used questionnaire and in-depth interview to collect data and use CFA for data analysis. This study addresses the description of the indicators of the scale question items using mean, standard deviation, skewness and kurtosis; and the reliability level and correlations of the scale dimensions were measured. The confirmatory factor analysis was used to analyze the validated factor model and second-order factor model of variables PK, TA, PA, RA, SDA, CCA, PV, PT and their independent variables. The structural model was used to describe and analyze the overall model results of the teacher competency model.

2. Research Steps

Firstly, literature review and hypothesis development. The researcher reviewed existing teacher competency models (such as Jiang, 2024; Purwati, E., & Sukirman, D., 2024; Su, 2023; Alan, B., & Güven, M., 2022; Lin, T., Zhou, P., & Wu, J., 2020; Xie, 2019) and identified gaps in private applied universities in Guangdong Province and proposed a preliminary competency framework with key dimensions.

Secondly, questionnaire design and data collection. Based on literature and expert opinions, a Likert scale questionnaire was developed to conduct a survey online and the researcher conduct semi-structured interviews with 9 experts.

Thirdly, CFA validation. The research tested the hypothesized competency structure using AMOS/SPSS and evaluated model fit (e.g., CFI, RMSEA) and refined dimensions for optimal validity.

Lastly, model application and discussion. The researcher analyzed practical implications for teacher recruitment and training, and discussed limitations and future research directions.

3. Data Collection

This study distributed the questionnaire including 120 items to 507 respondents to collect data with the following steps: 1) Distributed questionnaires through "Questionnaire Star" which is a professional online survey platform in China. Respondents answered questions online and submit questionnaires online. 2) Collected data from the sample. 3) Brought the questionnaire to verify its completeness. The questionnaire was then encoded to evaluate the results of the data with a computer program.

This study interviewed 9 experts to collect data with the following steps: 1) Conducted a self-interview. 2) Collected opinions immediately at the end of the interview in each aspect. Each interview lasts for 40 to 60 minutes. 3) When the interview ended, summarized again; when experts had additional comments, recorded again. 4) In each interview, took notes of the interview contents.

4. Data Analysis

The researcher took all the received questionnaires to check the completeness of every questionnaire and bring the obtained data for statistical analysis by using a computer to calculate statistical values with a statistical package. There are steps to operate as follows:

1) Analyzed part 1 of the questionnaire about the status of the respondents by using qualitative variables, namely frequency and percentage, presented in the form of an accompanying table.

2) Analyzed part 2 of the questionnaire. The quality of data was analyzed using descriptive statistics, including skewness, kurtosis, mean and standard deviation of each variable. Pearson's Product Moment Correlation Coefficient was used to the correlation analysis of the variables.

3) Used CFA for data analysis. Internal consistency reliability of the Likert scale was assessed using Cronbach's α . The suitability of data for factor analysis was evaluated through KMO test and Bartlett's test of sphericity. In CFA, convergent validity was examined by assessing the statistical significance and magnitude of standardized factor loadings. The model fitting indices, such as GFI, AGFI, TLI, CFI, RMR and RMSEA, and the chi-square value, the degree of freedom, and p -value were used to evaluated the construct validity of the overall model to ensure consistency between theoretical models and empirical data.

4) Presented the results of the analysis of teacher competency model by using the conclusions from the questionnaire and the interview analysis by content analysis.

5. Research Results

1. Results of Demographic data of the Respondents

On the demographic frequency analysis of this study, the total number of respondents in this study was 507. The percentage of males was 47.73% and that of females was 52.27%. In terms of age, the smallest number of people were under 25 years old, accounting for only 1.38%, while the largest number of people were between 30-39 years old, accounting for 33.26%. In terms of educational background, the number of people with master's degree is the highest, accounting for 67.65%, followed by doctoral degree accounting for 23.47%. The number of people with 16-20 years of work experience is the highest, accounting for 37.87% and those with more than 20 years of work experience were the least, with 7.69%.

2. Results of descriptive analysis

The quality of data was analyzed using descriptive statistics, including skewness, kurtosis, mean and standard deviation of each variable. The dataset (see Table 1) presents the key distributional characteristics of the eight variables (PK, TA, PA, RA, SDA, CCA, PV, PT). The means of all variables were highly concentrated between 3.677 and 3.891, indicating that the overall data were high, with PT having the highest mean (3.891) and SDA having the lowest mean (3.677). Regarding the degree of dispersion, the standard deviation fluctuated between 0.779 (PT) and 0.950 (SDA), indicating that PT had the most aggregated data, while SDA had the greatest individual variation. Notably, all variables showed significant left-skewed distributions (negative skewness) with all negative skewness coefficients (-0.877 to -1.388), and in particular, the left-hand side of the tail dragging phenomenon was prominent for PT (-1.388), PA (-1.296), and RA (-1.288), suggesting that there were more extremes or a lower limit of the score effect in the low-scoring regions of the data distribution.

Table 1 Descriptive statistics of Variables

Variable	Skewness	Kurtosis	M	S.D.	Interpret
PK	-1.007	-0.696	3.741	0.907	High
TA	-1.226	0.316	3.862	0.902	High
PA	-1.296	0.024	3.844	0.864	High
RA	-1.288	0.008	3.826	0.860	High
SDA	-0.877	-0.931	3.677	0.950	High
CCA	-1.248	-0.077	3.847	0.862	High
PV	-1.178	-0.274	3.796	0.888	High
PT	-1.388	0.442	3.891	0.779	High

3. Results of correlation analysis

In the correlation analysis of the variables, PK, TA, PA, RA, SDA, CCA, PV, PT were correlated between the two, and the results of the correlation analysis showed a significant positive correlation between the different variables two by two.

4. Results of reliability analysis

The internal consistency reliability of the Likert scale in this study is estimated by Cronbach's alpha, the most widely used measure for assessing the research construct and its dimensions. It is usually regarded that the coefficient reaches 0.7, then it has good reliability. In this study, the reliability values of the measurement variables ranged from 0.824 (PGA) to 0.886 (PTK), and the reliability values of the different dimensions were above 0.7, which made the reliability of the questionnaire reasonable.

5. Results of KMO and Bartlett's Test

The KMO value of the measured variable is 0.942, the chi square value is 39378.198, the degree of freedom is 7140, and the significance level is below 0.05. The results of KMO Measure of Sampling Adequacy and Bartlett's Test of Sphericity in this study indicate that the current dataset is highly suitable for factor analysis. The KMO value of 0.942 exceeds the threshold of 0.9, falling into the "marvelous" category, which suggests that the variables share substantial common variance and the data exhibit strong structural patterns and correlations. Additionally, the highly significant Bartlett's test ($p < 0.001$) and the extremely large chi-square statistic (39,378.198) further confirm that the variables are significantly interrelated, rejecting the null hypothesis of variable independence and satisfying the fundamental assumptions for factor analysis.

6. Results of CFA

6.1 CFA results of PK

PK comprised Professional Theoretical Knowledge (PTK), Professional Practical Knowledge (PPK) and Information Technology Knowledge (ITK). The factor loading values were 0.965 for PTK, 0.967 for PPK, and 0.982 for ITK. The CMIN/DF value of the model was 1.215, with a chi-square value of 105.678, and degrees of freedom of 87, $p>0.05$. The rest of the fitness metrics, $GFI=0.973$; $AGFI=0.963$; $TLI=0.995$; $CFI=0.996$; $RMR=0.028$; $RMSEA=0.021$; all the fitness indexes meet the requirements, indicating that the model matches the scale better and the model fit is higher (see Figure 1).

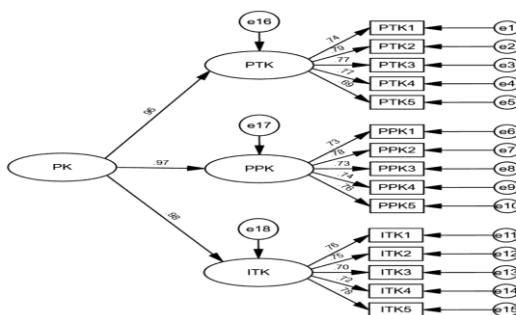


Figure 1 CFA results of PK

6.2 CFA results of TA

TA comprised Classroom Teaching Ability (CTA), Practical Teaching Ability (PTA), and Teaching Evaluation and Feedback Ability (TEF). The factor loading values were 0.977 for CTA, 0.972 for PTA, and 0.978 for TEF. The CMIN/DF value of the model was 1.074, the chi-square value was 93.439, and the degree of freedom was 87, $p>0.05$. The rest of the fitness metrics, $GFI=0.976$; $AGFI=0.968$; $TLI=0.998$; $CFI=0.999$; $RMR=0.026$; $RMSEA=0.012$; all the fitness indexes meet the requirements, indicating that the model matches the scale better and the model fit is higher (see Figure 2).

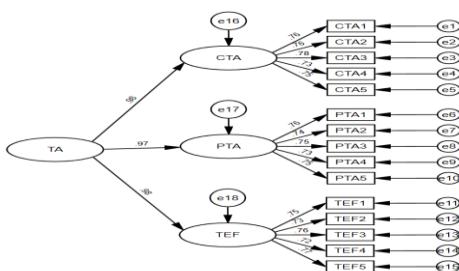


Figure 2 CFA results of TA

6.3 CFA results of PA

PA comprised Practical Guidance Ability (PGA), Social Service Ability (SSA) and Industry-University-Research Cooperation Ability (IUC). The factor loading values were 0.968 for PGA,

0.981 for SSA, and 0.950 for IUC. The CMIN/DF value of the model was 1.324, the chi-square value was 115.151, and the degree of freedom was 87, $p>0.05$, and the rest of the fitness metrics, GFI=0.971; AGFI=0.961; TLI=0.992; CFI=0.993; RMR=0.028; RMSEA=0.025; all the fitness indexes meet the requirements, indicating that the model matches the scale better and the model fit is higher (see Figure 3).

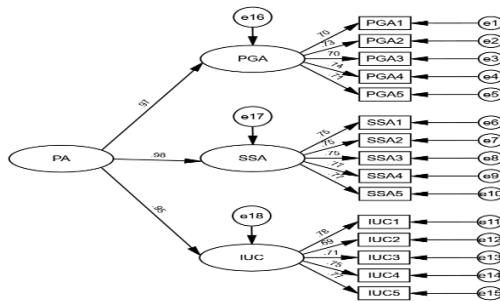


Figure 3 CFA results of PA

6.4 CFA results of RA

RA comprised Scientific Research Ability (SRA), Technological Innovation Ability (TIA) and Technological Achievement Transformation Ability (TAT). The factor loading values were 0.985 for SRA, 0.973 for TAT, and 0.978 for TIA. the CMIN/DF value of the model was 1.142, the chi-square value was 99.345, the degree of freedom was 87, $p>0.05$, and the rest of the fitness indexes, GFI=0.974; AGFI=0.964; TLI=0.996; CFI=0.997; RMR=0.026; RMSEA=0.017; all the fitness indexes meet the requirements, indicating that the model matches the scale well and the model fit is high (see Figure 4).

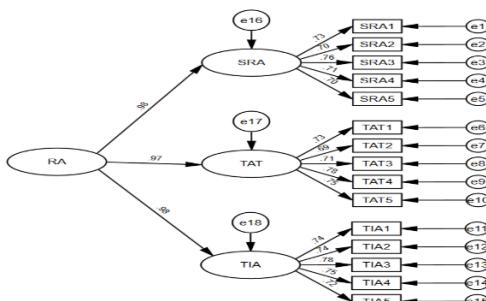


Figure 4 CFA results of RA

6.5 CFA results of SDA

SDA comprised Learning Ability (LA), Innovation Ability (IA), and Reflection Ability (REA). The factor loading values were 0.915 for LA, 0.964 for IA, and 0.908 for REA. The CMIN/DF value of the model was 1.668, the chi-square value was 145.155, the degree of freedom was 87, $p>0.05$, and the rest of the fitness metrics, GFI=0.963; AGFI=0.949; TLI=0.985; CFI=0.987; RMR=0.038; RMSEA= 0.036; all the fitness indexes meet the requirements, indicating that the model matches the scale better and the model fit is higher (see Figure5).

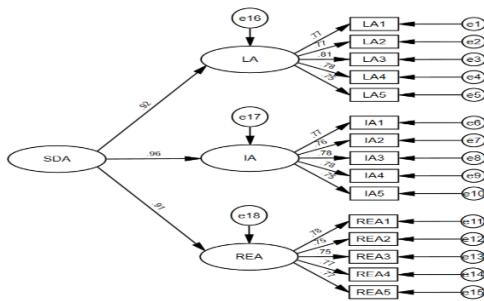


Figure 5 CFA results of SDA

6.6 CFA results of CCA

CCA comprised Communication Ability (CA), Teamwork Ability (TTA) and Language Expression Ability (LEA). The factor loading value of CA was 0.976, that of TTA was 0.947, that of LEA was 0.978. The CMIN/DF value of the model was 1.264, the chi-square value was 109.930, and the degree of freedom was 87, $p>0.05$, and the rest of the fitness indicators, GFI= 0.972; AGFI= 0.961; TLI= 0.993; CFI= 0.995; RMR= 0.028; RMSEA= 0.023; all fit indicators reached the level of the model. All the fitness indexes meet the requirements, indicating that the model matches the scale better and the model fit is higher (see Figure 6).

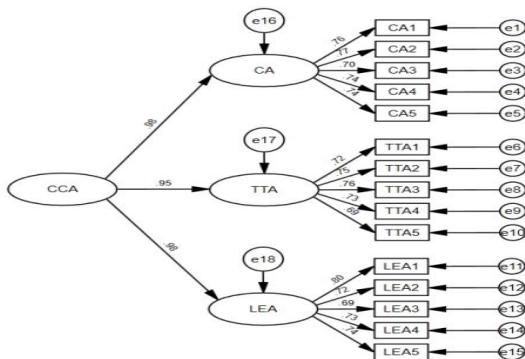


Figure 6 CFA results of CCA

6.7 CFA results of PV

PV comprised Professional Ethics (PE), Professional Identity (PI) and Student-Centered (SC). The factor loading value of PE is 0.956, the factor loading value of PI is 0.901, and the factor loading value of SC is 0.907. The CMIN/DF value of the model is 1.145, the chi-square value is 99.647, the degree of freedom is 87, $p>0.05$, and the rest of the fitness indexes, GFI= 0.974; AGFI= 0.964; TLI= 0.996; CFI= 0.997; RMR= 0.030; RMSEA= 0.017; all the fitness indicators meet the requirements, indicating that the model matches the scale better and the model fit is higher (see Figure 7).

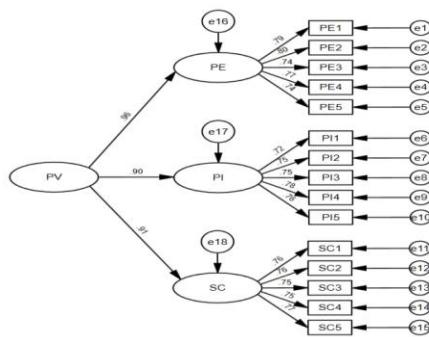


Figure 7 CFA results of PV

6.8 CFA results of PT

PT comprised Sense of Responsibility (SOR), Personality Charm (PC) and Achievement Motivation (AM). The factor loading value of SOR is 0.922, PC is 0.934, and AM is 0.942. The CMIN/DF value of the model is 1.310, the chi-square value is 113.949, the degree of freedom is 87, $p>0.05$, and the rest of the fitness metrics, GFI=0.972; AGFI=0.961; TLI=0.991; CFI=0.993; RMR=0.027; RMSEA=0.025; all the fitness indexes meet the requirements, indicating that the model matches the scale well and the model fit is high (see Figure 8).

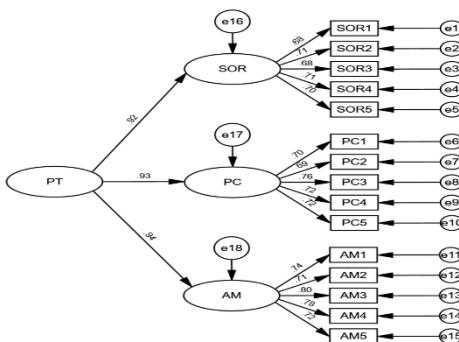


Figure 8 CFA results of PT

6.9 Final factor model

The final factor model (see Figure 9) demonstrated excellent fit to the data, supporting the hypothesized structure of the teacher competency model for private applied universities (TCMP). The factor loading value of PK is 0.692, the factor loading value of TA is 0.474, the factor loading value of PA is 0.508, the factor loading value of RA is 0.656, the factor loading value of SDA is 0.533, the factor loading value of CCA is 0.510, the factor loading value of PV is 0.551, the factor loading value of PT is 0.464 (see Table 4). The CMIN/DF value of the model was 1.083, the chi-square value was 264.278, the degree of freedom was 244, $p>0.05$, and the rest of the fitness indexes GFI= 0. 959; AGFI= 0. 950; TLI= 0. 998; CFI= 0. 998; RMR= 0. 032; RMSEA=0.013; all the fitness indexes meet the requirements, which indicates that the model matches the scale better, and the model fit is high.

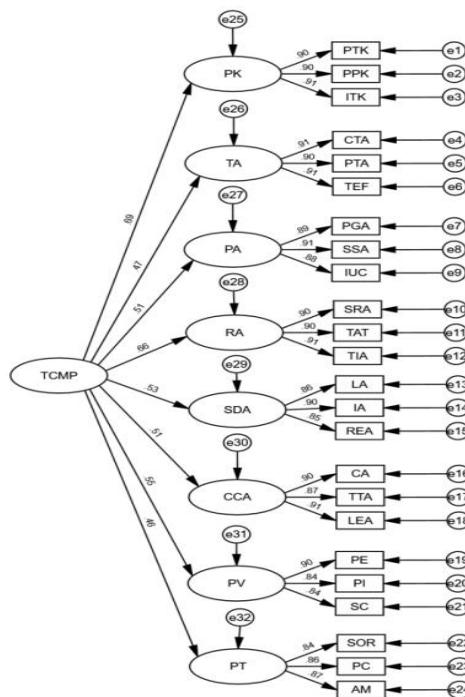


Figure 9 Final factor model

6. Discussion

The testing results confirmed that PK, TA, PA, RA, SDA, CCA, PV and PT all exerted statistically significant positive effects on teacher competency. Non-standardized path coefficients (Estimate) ranged from 0.464 (PT) to 0.692 (PK), with all $*p$ -values $< .05$, indicating robust empirical support for the hypothesized relationships.

Analysis results of basic statistics of variables in this study show that all observed variables have a normal distribution. All the fitness indexes meet the requirements, indicating that the model matches the scale better and the model fit is higher.

In summary, for the teacher competency model for private applied universities in Guangdong Province, this research used confirmatory factor analysis to verify the correctness of the model. According to the simulation results, it has been observed that the model is obtained as per-threshold mentioned. Therefore, this study proposed that the model was established.

Based on content analysis of 9 interviewees' in-depth interview, the researchers summarized and finally concluded that the statistical analysis data of the 9 interviewees were consistent with the development of the teacher competency for private applied universities in Guangdong Province verified in this paper, and were in line with the conceptual framework of this study.

7. Recommendations

1. Recommendations for the application of research results

The teacher competency model can be applied to optimize the recruitment and selection mechanism for teachers. Based on the characteristics of applied universities, a diversified evaluation system centered on the teacher competency model can be established to avoid excessive reliance on academic qualifications or the number of papers. The reconstruction of the teacher training and development system requires breaking through traditional training models, and establishing a hierarchical and classified training mechanism that matches the competency model. The reform of performance evaluation and incentive mechanisms is a key guarantee for ensuring the effectiveness of the competency model. A multidimensional evaluation system should be established to significantly increase the weight of dimensions such as practical teaching achievements and social service contributions based on traditional indicators. Traditional assessments often become superficial and difficult to truly reflect the development status of teachers' abilities. Therefore, a teacher competency development file based on big data should be constructed to form a three-dimensional competency assessment map.

2. Recommendations for future research

The current research has not yet established a differentiated weight system for model dimensions, which makes it difficult to reflect the relative importance of various competency elements. Future research can integrate qualitative and quantitative methods and develop empirical weight systems and quantitative evaluation tools. The existing research has not yet delved into the interaction between various competencies. In the future, advanced statistical methods such as structural equation modeling (SEM) or social network analysis (SNA) can be used to systematically analyze the synergistic or inhibitory effects between competency dimensions. To further enhance the scientificity and universality of the teacher competency model, future research can expand the sample coverage, break through the limitations of existing regions, and provide differentiated reference for the development policies of applied university teachers in different regions. In addition, future research can investigate the causal relationship between competency models and the effectiveness of teacher professional development, as well as the differential characteristics of different types of teachers in the construction of competency models.

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