

## THE EFFECTS OF THE MIDDLE LAYER ON CHINESE COLLEGE TEACHERS' COMPETENCE MODEL: A META-ANALYSIS

Lei You<sup>1</sup>, Pei-Hua Tsai<sup>2</sup>, & Lung-Hsing Kuo<sup>2</sup>

<sup>1</sup>*Department of Literature and Communication, Hengshui University (China)*

<sup>2</sup>*Center for General Education, National Kaohsiung Normal University, Taiwan (R.O.C)*

### Abstract

In this paper, based on the competence onion model theory, we conducted an integrated study of empirical data in the middle layer of the competence model of Chinese university teachers by means of meta-analysis. A total of 30 previous studies were included, resulting in a total sample size of 16,632 individuals. The result showed that the overall performance of male teachers was better than that of female teachers in the middle layer of the Chinese university teacher competence model, and the average effect size was significant. Furthermore, research showed that among the four dimensions of attitude, values, self-concept, and social role in the middle layer, only the dimension of social role had a significant effect size and indicated that the overall performance of male teachers in this dimension was better than that of female teachers, and the level of superiority was low. The results indicated that there were clear differences in the overall performance of male and female teachers in different regions. The overall performance of the female teachers in North China was significantly better than that of the male teachers, with lower and weaker levels of excellence, while the overall performance of the male teachers in South China was better than that of the female teachers, with lower levels of excellence. The findings provide future researcher with references on the university faculty competency model.

**Keywords:** *Competence, college teachers, middle layer, meta-analysis.*

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### 1. Introduction

In the onion model of competence proposed by Boyatzis (1982), it was divided from the inside out into personality and motivation layers, attitude, values, self-concept and social role layers, and knowledge and skill layers. The middle layer is crucial in connecting the core and the outermost layers. Even if an individual has great qualifications and can easily learn knowledge and master skills, an individual will still not be qualified for a specific job if an individual does not have the right attitude and values or cannot properly recognize himself or herself and play potential in a team. In the competence onion model, the middle layer played a crucial role in connecting the core layer and the outermost layer. With China's rapid economic growth, a number of studies on the competence of university teachers has been investigated. Therefore, this purpose of this paper was to investigate the intermediate layers of the college teacher competence model in depth.

According to the analysis of the literature, the findings of the previous studies on the competence of mid-level faculty in colleges and universities were quite different. For example, Chen and Wang (2009) pointed out that there was no significant difference between male and female instructors in the three factors of professional attitude and quality, self-regulation, and extraversion. Xu (2011) believed that female teachers performed better than male teachers in the middle layer of the model. Peng (2016) research pointed out that male teachers are significantly higher than female teachers in management ability, agreeable personality, and total score of self-concept. Therefore, this research questions of this paper focused on the following issues:

1. In terms of the middle layer of the competence model for Chinese university teachers, which gender performs better in terms of competence, male teachers, or female teachers?
2. How do male and female teachers perform in the four dimensions of attitude, values, self-concept, and social role respectively?
3. In the analysis of gender differences in the middle layer of the competence model for Chinese university teachers, are the location and geographic division of teachers in China the moderating variables affecting them?

## 2. Literature review

The middle layer of the onion model Boyatzis (1982) includes four dimensions of attitude, values, self-concept, and social role, as the persistent and consistent mental state or personality tendency of individuals to all kinds of people, things, and objects in their work situation based on experience. However, scholars have used different names for these dimensions in their studies. For example, the names of attitude dimensions include career preference (Lin, 2018), work attitude (Meng & Xuan, 2021), service spirit (Qiao, 2019), etc. The dimensions of values include political accomplishment (Chen, 2010), social responsibility (Tian, 2015), work values (Liu, 2019), etc.; the dimensions of self-concept include: self-knowledge (Meng & Xuan, 2021), self-image (Chen, 2018), etc.; the dimensions of the social role are named as interpersonal interaction (Xu, 2011), harmony between teachers and students (Chen, 2010), and teamwork (Chen, 2011). This study first classified and categorized these competency dimensions according to their definitions and the competency characteristic elements they contain, and then extracted empirical research data for in-depth discussion.

## 3. Methodology

In the process of literature collection, the terms "competence" and "university", "university" and "higher vocational education" were put into the searching engine in academic databases of China National Knowledge Network (CNKI), Wanfang, and Baidu, respectively. At the same time, retrospective methods were also used to check the references of critical material to additionally find relevant content. The literature covers a period from June 2006 to July 2021, with a preliminary collection of 936 papers.

In this paper, Comprehensive Meta-analysis (CMA) integrated analysis software was used, and each piece of data information is counted as an "independent event" in the research process, and the "individual effect size" of each content is calculated in a standardized way. Then the individual effect volume as a unit of analysis, and finally the overall effect evaluation (Hedges, 1981). In literature screening, literature with different background data for the study subjects and comparative analysis were all selected, so the effective number of individual studies may be multiple. Chang (2014) believed that in the process of meta-analysis, if type I error  $\alpha = .05$  and type II error  $\beta = .8$  were used in the calculations, and the optimal number of articles to include in the meta-analysis would have been more than 24, with 27 articles eventually included in the present study.

From the literature discussion, the positions of university teachers were related to the competence study of Chinese university teachers and the cultivation of students and are mainly divided into three categories: full-time teachers, counselors and administrators. In terms of geographic division, China is divided into seven regions: North China, Northeast China, East China, Central China, South China, Southwest China, and Northwest China, based on historical and ethnic factors and related geographical division principles. If the included literature is nationally sampled, the relevant data will not be included in the discussion.

A total of 30 articles were included in this study. Quantitative data that met the requirements were selected based on demand, and a total of 57 data items were selected.

The Cochran Q test and  $I^2$  were used as criteria for the homogeneity test. When the Q value reaches the significance level, it indicates the presence of heterogeneity in the literature, which was characterized by the ease of achieving significance as the number of samples increased. Then  $I^2$  value was referred to. Higgins et al. (2003) have pointed out that  $I^2$  values of 25%, 50%, and 75% represent low, medium, and high levels of heterogeneity respectively. Hedges and Vevea (1998) pointed out that the fixed effect model should be adopted if the effect quantity is homogenous. A random effect model is used if heterogeneity is shown in the effect size. The results on the analysis of gender differences in the middle layer of the model, the Q ( $p < .01$ ) value to a statistically significant level,  $I^2$  was 80.684%, indicating that the observed variation was caused by the difference in the effect size, indicating the high heterogeneity of it. Therefore, the random utility model was adopted in this study.

The publication bias test was performed and analyzed with  $N_{f.s.}$  (Classic fail-safe N) values. Tests showed that  $N_{f.s.}$  value was  $198(5k+10)$ , k was the number of studies), which was slightly lower than the tolerance number 295 proposed by Rosenthal (1991). However, considering that the total number of empirical data related to the same type of study in China was already included, the results are within the acceptable range. It can be considered that the weighted average effect size  $g = .063$  was less affected by publication bias. A funnel plot was used to further check the distribution of effect quantity, and the results. Most of the effect quantity is located at the top of the funnel plot on both sides, the overall symmetry phenomenon, a few offsets on both sides of the periphery, and the bottom of the funnel have a small amount of effect quantity.

## 4. Results and discussions

### 4.1. Main effect analysis of gender difference in the middle layer of model

The results of the meta-analysis of gender differences in the middle layer were shown in Figure 2. There were 7,618 males and 9,014 females in the study sample, for a total of 16,632. Among the 57 data, 19 items showed significant individual effects, and 38 items showed no significant individual effect. The overall weighted average effect  $g$  value was .063 ( $p < .05$ ), 95% confidence interval was [.006-.12], excluding zero. The results showed that male teachers perform better than female teachers in terms of the middle of the model in the current research on college teachers' competence. According to Cohen's (1988) explanation of the effect size (if the size is less than .2, it means low effect size; about .5 is a medium effect level; above .8 is considered a high effect size), and the weighted average effect size obtained as a result belongs to the low and weak degree.

Based on the total effect analysis, the group analysis was conducted according to the four dimensions of attitude, values, self-concept, and social role contained in the middle layer. As shown in the table below, the competence performance of male and female teachers is significantly different among all dimensions ( $Q_B = 8.891$ ,  $p < .05$ ). Separately, the competence performance of males in the dimension of the social role is significantly better than that of females ( $r = .158$ ,  $p < .05$ ), and the degree of superiority was low and weak, while the other dimensions are not significant.

### 4.2. Moderator variables

**4.2.1. Teachers' position.** The variation between teachers' positions was not significant ( $Q_B = .441$ ,  $p > .05$ ), indicating that it was not the moderating variable that affects the analysis.

**4.2.2. Geographical Division of China.** There was a lack of data from Northeast China and South China in the literature collection, so it would not be discussed in this grouping analysis. Some data were sampled nationwide without detailed geographical division, so it would not be discussed in this grouping. The results showed that geographical division of China among groups was significant ( $Q_B = 11.641$ ,  $p < .05$ ), indicating that male and female teachers in the middle layer of the model have different performances in different geographical divisions, which also indicates that geographical division of China was the moderator variable affecting the analysis of teacher gender differences in the competence of college teachers. The results showed that the overall performance of female teachers in North China was significantly better than that of male teachers, and the superior level was lower and weak ( $r = -.062$ ,  $p < .05$ ); The overall performance of male teachers in Southwest China was significantly better than that of female teachers, and the superior level was low ( $r = .275$ ,  $p < .05$ ); And in East China, Central China and Northwest China, there was no significant difference between male and female teachers in the overall performance.

The results are close to those of Peng (2016), Zhang (2016), and Lv (2011). In the studies of other scholars, Chen and Wang (2009), Liang (2012), Li (2011), and Qiao (2019) believed that there was no significant difference in the performance of middle layer competence between genders, while Xu (2011), Su (2014), Chen (2015) et al. concluded that female performance was superior to male performance, which was different from the results of this study. In the process of further reference, it was found that although Jiang (2019), Chen Yan (2018), and other literature collected questionnaire data nationwide, the number of research samples were less, which was not in line with Sudman (1983) claimed that on the number of samples (the research object was nationwide, and the sampling number was 1500-2000 people was appropriate), it may affect the results.

## 5. Conclusions

The teachers' position and geographical division of China as the moderator variable to join the analysis can be known: First, teachers' position was not the moderating variable that affects the gender difference analysis in the middle layer of college teachers' competence model. Then, the overall performance of male teachers engaged in the post of counselors was significantly better than that of female teachers, and the superior level belongs to the low degree. As for the Regional division of China was the moderating variable affecting the analysis of gender difference in the middle layer of college teacher competence model. The overall performance of female teachers in North China was significantly better than that of male teachers, and the superior level was low and weak degree. The overall performance of male teachers in southwest China was significantly better than that of female teachers, and the superior level was low degree. In East China, Central China, and Northwest China, male teachers are not significantly better than female teachers, and the highest level of superiority was in Northwest China, which was only a low and weak degree.

## References

- Boyatzis, R. E. (1982). *The competent manager: a model for effective performance*. New York: Wiley Press.
- Chang, S. X. (2014). *Meta-analysis implementation: Using Excel and CMA program*. Taipei: Wunan Book Publishing Company.
- Chen, H. (2010). *Research on the Competence of ideological and Political Theory Teachers in Colleges and Universities* [Doctoral dissertation, Hebei University of Technology].
- Chen, J. (2015). Research on competence Model of Undergraduate counselors in Shaanxi Province. [Master's thesis, Xi 'an Shiyou University].
- Chen, J. W., & Wang, Z. H. (2009). An empirical study on the Competence characteristic structure model of college counselors. *Journal of Higher Education*, 30(1), 84-89.
- Chen, M. (2014). *Research on the relationship between competence characteristics and job Performance of Physical Education teachers in colleges and universities in Fujian Province* [Master's thesis, Fujian Normal University].
- Chen, Y. (2018). *A study on the influence of the Competence of private College counselors on Career Planning* [Master's thesis, Nanchang University].
- Chen, Y. S. (2011). *Research on Performance Evaluation of college counselors based on Competence* [Doctoral dissertation, Nanjing University of Aeronautics and Astronautics].
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Hedges L. V., & Vevea, J. L. (1998). Fixed-and random-effects models in meta-analysis. *Psychological methods*, 3(4), 486-504.
- Hedges, L. V. (1981). Distribution Theory for Glass's Estimator of Effect Size and Related Estimators. *Journal of Educational Statistics*, 6(2), 107-128.
- Higgins, J., & Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ*, 327, 557-560.
- Jiang, X. L. (2019). Investigation and Reflection on the Competence of young teachers in Western Universities. *Chongqing Higher Education Research*, 7(1), 47-58.
- Li, X. M. (2011). Research on Competence Model of Teachers in Teaching and Research Universities [Master's thesis, Jiangsu University].
- Liang, T. (2012). *A study on the relationship between college counselors' competence-self-efficacy and job performance* [Doctoral dissertation, Wuhan University].
- Lin, H. X. (2018). *Research on the Influence of Performance Appraisal Orientation on the Competence of university teachers* [Master's Thesis, Dalian University of Technology].
- Liu, S. S. (2019). *Research on competence Model and Professional Development of new teachers in Research Universities in China* [Master thesis, Jilin University].
- Lv, C. (2011). *Construction and Application of Competence Model for College Counselors —Take XX University as an example* [Master's thesis, Nanchang University].
- Meng, F., & Xuan, B. (2021). Proactive personality and competence of college psychology commissioners: the mediating effect of autonomy. *Chinese Journal of Health Psychology*, 30(1), 152-156.
- Peng, M. R. (2016). *An empirical study on the competence of double-qualified teachers in Higher Vocational Colleges* [Master's thesis, Jiangxi Science and Technology Normal University].
- Qiao, X. (2019). *Research on construction and Application of competence Model for college counselors* [Master's thesis, Qingdao University].
- Rosenthal, R. (1991). *Meta-analytic procedures for social research*. Beverly Hills, CA: Sage.
- Sudman, S. (1983). Applied sampling. In P. H. Rossi, J. D. Wright, & A. B. Anderson (Eds.), *Handbook of Survey Research* (pp. 145-194).
- Tian, G., & Gao, X. (2015). Research on the Present Situation and Countermeasures of PE Teacher's competence in Colleges and Universities – Take Guizhou Province as an example. *Science and Technology of Sports*, 36(6), 117-118.
- Zhang, M.Z. (2016). *Research on the Competence improvement of university counselors based on team role Theory* (Doctoral dissertation, Southwest University).