Construction of the management model of faculty in applied transition colleges

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Abstract. The professional development of college teachers is not only the internal demand of teachers' self-development, but also an important means of optimizing school classification management. However, there is no appropriate and reasonable model for the management of college teachers. This paper uses literature analysis, interviews and questionnaire surveys, factor analysis, and structural equation modeling (SEM) methods to establish and verify the application of the six major influencing factors (ideals and beliefs, teacher development conditions, teacher-student relations, talent management, to analyze management model of teacher's morality and style construction and ability literacy. And correlation analysis is carried out, thus providing direction guidance for the construction of university teachers and school teaching and administrative management.

1. Introduction
At present, my country has established a policy guarantee system for the construction of college teachers with clear goals, multiple levels and multiple dimensions. The "Opinions on Comprehensively Deepening the Reform of Teacher Team Building in the New Era" clearly emphasizes "to comprehensively improve the quality of teachers in colleges and universities, build a high-quality and innovative teacher team. Focus on improving the professional capabilities of teachers, and promote the connotative development of higher education." Zhang Jiming and Han Hong’s research on the reflection and reform of the development model of Chinese colleges and universities shows that the development model of Chinese colleges and universities is deeply constrained by tradition. The managerialism and performanceism in the context of administrativeization actually affect teachers’ autonomy and independence. The innovation space has caused a heavy squeeze, which ultimately leads to the difficulty of making breakthrough progress in teaching reform and innovation. Therefore, it is proposed that in the process of de-administration in colleges and universities, the cognition and concept of the development of college teachers must be actively updated, and the support system for teacher development must be changed from administration and control to service and specialization, and establish a systematic The teacher development service and support system meets the needs of teachers in various aspects such as professional development, continuous experience of happiness and efficacy, improvement of spiritual realm, and achievement of social conditions [1]. In 2020, Zeng Xiaojun’s selection and optimization of policy tools for private education management pointed out that in the selection of policy tools for private education management, strengthening the construction of modern school systems ranked first, reaching 38.4%, and innovating systems and mechanisms accounted for 16.3%. The quality of education and teaching
is only 5.8%, which is far behind [2]. In the same year, Wang Chunxiu published an article on the reform of the management system of the biochemical teacher team on current political hotspots, putting forward new tasks and requirements for solidly implementing the reform of the teacher team management system, accurately grasping the new situation and new problems of the construction of the teaching team in colleges and universities, and deepening the creation of the teaching team The new path and new situation of management system reform [3].

Creating a team of college teachers with noble ethics, exquisite business, reasonable structure, and full force is the driving force of local application-oriented colleges and universities' management efficiency and the growth point of educational productivity [4][5]. Constructing a classified management model for the faculty of colleges and universities is an important part of promoting the management of the faculty [6-7]. Therefore, in response to this problem, this article proposes the use of factor analysis and structural equation modeling to construct a management model for the faculty of colleges and universities, and proposes how to reform the faculty of colleges and universities based on the principle of "talent-oriented and teacher-oriented" construction [8]. And analyze the main factors that affect the construction of the teaching staff of universities. Educational plan, teacher-oriented, provides guidance for the better realization of the work of college teachers in the future.

2. Principles and algorithms

The methods used in this article include factor analysis and structural equation modeling. Factor analysis refers to a multivariate statistical method that starts from the internal dependence relationship of the matrix related to the research indicators, and reduces some variables with overlapping information and intricate relationships into a few unrelated comprehensive factors. It is also a kind of data dimensionality reduction. Kind of commonly used means. It is precisely because there are many factors studied in this article, and there are many items for each factor, so it is necessary to find its potential common factors.

The core of factor analysis is to perform factor analysis on several comprehensive indicators and extract common factors, and then use the variance contribution rate of each factor as the sum of the weight and the score multiplier of the factor to construct the score function. The mathematical expression of factor analysis is a matrix: \( X = A F + B \), as follows:
Vector $X(x_1, x_2, x_3, \ldots, x_p)$ is an observable random vector, that is, the original observation variable. $F(f_1, f_2, f_3, \ldots, f_p)$ is the common factor of $X(x_1, x_2, x_3, \ldots, x_p)$, that is, the factors that appear together in the expressions of the original observation variables, which are independent and unobservable theoretical variables. It is $A(\alpha_\beta)$ common factor $F(f_1, f_2, f_3, \ldots, f_p)$ coefficient, called the factor loading matrix.

Structural equation model (SEM) is a statistical method to analyze the relationship between variables based on the covariance matrix of variables, and is an important tool for multivariate data analysis. In fact, it is an extension of general linear models, including factor models and structural models. It embodies the perfect combination of traditional path analysis and factor analysis. It is often used for confirmatory factor analysis, high-order factor analysis, path and causality analysis, and multi-period analysis. Simplex model analysis and multi-group comparison, etc. The four major steps of SEM are: 1. Model construction; formulate the relationship between observed variables and latent variables, specify which factors have correlation or direct effects, and in complex models, we can limit the parameters such as factor conformance or factor correlation coefficient value or relationship. 2. Model fitting; the main thing is the estimation of model parameters. 3. Model evaluation; for example, whether the structural equation solution of the model is appropriate, whether the estimation converges, and whether the estimated value of each parameter is within a reasonable range. 4. Model modification; check the relationship between latent variables and indicators, and establish a measurement model. The flow chart of the specific process is as follows:

$$x_1 = \alpha_{11} f_1 + \alpha_{12} f_2 + \alpha_{13} f_3 + \ldots + \alpha_{1k} f_k + \beta_1$$

$$x_2 = \alpha_{21} f_1 + \alpha_{22} f_2 + \alpha_{23} f_3 + \ldots + \alpha_{2k} f_k + \beta_2$$

$$x_3 = \alpha_{31} f_1 + \alpha_{32} f_2 + \alpha_{33} f_3 + \ldots + \alpha_{3k} f_k + \beta_3$$

$$\ldots$$

$$x_p = \alpha_{p1} f_1 + \alpha_{p2} f_2 + \alpha_{p3} f_3 + \ldots + \alpha_{pk} f_k + \beta_p$$
3. Experimental results and discussion

3.1. Experimental design
In the research of this article, the method of combining qualitative and quantitative research is adopted. The literature analysis method is used to understand the current research situation of the teaching team management of the applied transformation colleges and universities; the interview method, the questionnaire survey method and the principal component analysis method are used to construct and verify the model of the applied transformation college faculty management. Collect data using the self-compiled Likert 5-level measurement scale "Questionnaire on the Status Quo of Teacher Management in Applied Transformation Colleges and Universities". The questionnaire includes basic information, ideals and beliefs, teacher development conditions, teacher-student relationship, talent management, teacher ethics, and ability literacy. The sample takes the application transformation universities in Yunnan Province as an example. The questionnaires were distributed and collected to the in-service teachers of the sample universities through Internet channels such as Questionnaire Star, WeChat, QQ, and finally 453 data were obtained. After data sorting and analysis, 432 valid questionnaire data were obtained, and the questionnaire effective rate was 95.37%.

The research organizes interviews, seminars and questionnaire surveys to collect research data on in-service teachers in sample universities.

3.2. Experimental results

3.2.1. Reliability and validity test. Use SPSS23 statistical software to test the reliability of the survey data. The results are shown in Table 1. The KMO value is equal to 0.772, the Bartlett
test statistic is equal to 22698, and sig is equal to 0.000, indicating that the questionnaire has good validity and can be further analyzed.

Table 1. KMO and bartlett's test.

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | 0.772 |
| --- | --- |
| Approx. Chi-Square | 22698 |
| Bartlett's Test of Sphericity | df 903 |
| Sig. | 0 |

Cronbach's Alpha is equal to 0.94, indicating that the measured value of the questionnaire has good reliability and can be used for factor exploratory analysis.

Table 2. Reliability statistics.

| Cronbach's Alpha | N of Items |
| --- | --- |
| 0.94 | 43 |

3.2.2. **Factor lithograph.** Observe the value of each eigenroot. For the factor loading matrix, the i-th eigenvalue is the sum of the squares of the elements in the i-th column, that is, the variance contribution of the i-th factor. Factors whose variance contribution is greater than 1 are important factors. The analysis result is shown in the figure, and 6 factors can be selected.

Figure 3. Factor lithotripsy diagram.

3.2.3. **Exploratory factor analysis.** Through the factor loading rotation matrix analysis, we can understand how each factor explains the variance. The results are shown in the table.
Table 3. Factor loading matrix (explained total variance).

| Ingredients | Initial eigenvalue | Extract the sum of squares and load | Rotate the sum of squares loading |
|-------------|--------------------|-------------------------------------|----------------------------------|
|             | Total variance %   | Total variance %                    | Total variance %                  |
| 1           | 16.154             | 37.568                              | 16.154                           |
| 2           | 5.038              | 11.717                              | 49.285                           |
| 3           | 2.845              | 6.617                               | 55.901                           |
| 4           | 2.175              | 5.058                               | 60.959                           |
| 5           | 2.054              | 4.776                               | 65.735                           |
| 6           | 1.561              | 3.630                               | 69.365                           |

It can be seen from the above table that extracting 6 factors can explain 69.37% of the total variance, which meets the statistical requirements and is consistent with the extracted value of the factor lithograph. Therefore, the management model of the faculty of applied transformation colleges and universities includes 6 dimensions.

3.2.4. *Rotate the principal component matrix.* After rotating the principal component matrix, the orthogonal factor matrix table after the maximum variance rotation is obtained. The 6 principal component factors are analyzed, and the component conversion matrix is shown in the following table.

Table 4. Component conversion matrix.

| Ingredients | 1     | 2     | 3     | 4     | 5     | 6     |
|-------------|-------|-------|-------|-------|-------|-------|
| 1           | 0.795 | 0.586 | 0.124 | -0.053| -0.029| 0.081 |
| 2           | -0.085| 0.050 | 0.653 | 0.646 | 0.381 | 0.030 |
| 3           | -0.094| 0.364 | -0.686| 0.456 | 0.353 | -0.235|
| 4           | 0.157 | -0.217| -0.019| -0.449| 0.850 | 0.061 |
| 5           | 0.568 | -0.689| -0.210| 0.388 | -0.078| -0.046|
| 6           | -0.070| 0.019 | -0.206| 0.142 | 0.019 | 0.965 |

3.2.5. *Model empirical analysis.* Use Lisrel software to carry out structural equation model analysis and fitness test. The results are as follows:

Table 5. Recommended values of SEM fitting index.

| Fitting index | Chi-Square/df | GFI | AGFI | NFI | IFI | CFI | RMR  | RMS EA | P     |
|---------------|---------------|-----|------|-----|-----|-----|------|--------|-------|
| Result        | 4.16          | 0.91| 0.91 | 0.96| 0.92| 0.92| 0.047| 0.06   | 0.06  |
| suggested value | <5           | >0.9| >0.9 | >0.9| >0.9| >0.9| <0.05| <0.08  | >0.05 |

It can be seen from the table that the GFI value is 0.91, the NFII value is 0.96, the IFII value is 0.92, the CFI value is 0.92, and the PI value is 0.06. All indicators are within the acceptable range, the adaptability is ideal, and the model is reasonable.
Use SPSS23 to analyze the path of the model, and the direct standard path coefficients of its structural variables are shown in the figure:

![Diagram](image)

**Figure 4.** Structure variable path coefficient diagram.

For the standardized path coefficients in the model, an absolute value greater than 0.5 is a large effect, greater than 0.3 is a medium effect, and less than 0.1 is a small effect. According to the above figure, the absolute value of the standardized path coefficient of the model is partly greater than or equal to 0.5, indicating that it has a strong influence and a small part has a weak effect. For example, teachers’ ideals and beliefs and the school’s talent management measures will positively affect the teacher-student relationship and teacher’s development conditions, respectively, and the effects are closely related. However, the teacher’s competence and the construction of teacher ethics and style have insignificant effects on the teacher-student relationship. Influencing the effect, and the teacher's ability literacy has a positive effect on the teacher's development conditions.

4. **Conclusions**

Based on the statistical results of the questionnaires collected from the data survey on the status quo of college teachers’ application transformation management, this paper discusses the main factors that affect the direction of college teachers’ transformation management, and constructs related mathematical models. For the construction of college teachers and school teaching and administrative management Provide directions. The six main factors extracted can explain 69% of the entire model, indicating that the initial design of the entire model is relatively complete. In the structural equation model design, all indicators are within the ideal range, and there are standard path coefficients of 0.62, 0.79, 0.57, 0.65, 0.84, which are all greater than 0.5, indicating that the factors have a strong relationship. Therefore, we put forward the following suggestions. For example, the belief that teachers are determined to devote themselves to education, fostering morality, and improving their own qualities will affect the establishment and maintenance of the relationship between them and their clients (students). Therefore, we must be an example of virtue. The school's talent management measures will directly affect the professional development and occupation of teachers, so it is necessary to provide guarantee conditions for teacher development. The teacher's ability and literacy do not only significantly affect the teacher-student relationship, but it also has a certain effect. Teachers with personality charm, high emotional intelligence, and communication skills are more likely to establish good teacher-student relationships. Coordinating the research process of the whole article, although certain errors in the model is found, it can guide teachers to correctly understand the internal and external conditions of their own development to a certain extent, to create a harmonious management atmosphere in campus.
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