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# *Research on the Mechanism of Learning Motivation, Learning Engagement and Teaching Efficacy of Normal University Students*

**Zhang Xiaobo[1,2], Yang Min[2,3] , Li Dandan[2,4], Jongnam Baek[5,*]**

*[1]School of Education Science, Xinyang Normal University, Xinyang, Henan Province, China*
*[2]Dept. of Education and Culture Contents Development, Woosuk University, Wanju-gun, Republic of Korea(PhD in progress)*
*[3]School of Literature and Media, Xi'an Fanyi University, Xi'an, Shaanxi Province, China*
*[4]Editorial Department of Journal, Xinyang University, Xinyang, China*
*[5]Dept. of Special Education, Woosuk University, Wanju-gun, Republic of Korea*

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***Abstract:*** In this paper, the relationship between learning motivation, learning engagement and teaching efficacy of normal university students was investigated by questionnaire, and the mediating effect of learning engagement between learning motivation and teaching efficacy was tested. The results show that the learning motivation of normal university students mainly stems from the expectation of professional achievement and academic achievement, the focus dimension of learning engagement is higher than the vitality and dedication dimension, and the personal teaching efficacy is higher than the general education efficacy. There are significant correlations among the learning motivation, learning engagement and teaching efficacy of normal university students, as well as among the dimensions of the three. Learning motivation has a significant direct effect on teaching efficacy, and learning engagement plays a partial mediating role between learning motivation and teaching efficacy. Among the three dimensions of learning engagement, the mediating effect of the focus dimension on learning motivation and teaching efficacy is more significant.

## 1. Introduction

The century-long project is based on education. Building a strong educational country is the basic project for China's modernisation and internationalisation, and basic education is the foundation for realising the policy of a strong educational country.[1] The "National Outline for Medium and Long-Term Education Reform and Development" pointed out that in order to strengthen the construction of teachers, efforts should be made to build a professional teaching team with noble morals, excellent professional skills, reasonable structure and vitality.[2] Normal universities are the main places for training pre-service teachers. According to the needs of the

times and the personal ideological characteristics of pre-service teachers, universities should constantly adjust and improve the education plan, innovate the education system, integrate new technologies and new ideas into the daily education and teaching work, and constantly strive to improve the personal quality and ability of pre-service teachers.[3] This process is a practical issue that needs to be considered by college teachers. This study refers to Professor Hou's theoretical model and makes innovations on its basis. It will take the learning motivation, learning engagement, and teaching self-efficacy of student teachers as the research variables, attempting to further explore the relationships among these three variables, and understand their average levels and the influencing mechanisms.[4] To provide a theoretical foundation for the development of basic education in China and a basis for the reform and innovation of the pre-service teacher training system and model in normal universities.

## 2. Research Methods

### 2.1. Research Objects

This research takes undergraduate normal students in Chinese colleges and universities as the research objects and conducts convenience sampling. The research objects are undergraduate normal students majoring in education, literature, mathematics, chemistry, English, computer science and technology, English, mathematics, geography, physics, music education, art education, etc. in several normal universities in Chongqing, Shaanxi and Henan provinces of China. In order to successfully complete the later data analysis work, this research uses the online questionnaire filling system and sends the questionnaire to the subjects through various social platform channels. A total of 1,135 questionnaires were distributed in this study and 1,120 were recovered (recovery rate of 98.67%). All 1,120 recovered questionnaires were valid and all were used in this study.

### 2.2. Research Tools

(1) Learning Motivation Measurement Tools

The learning motivation measurement instrument employed in this study was modified and refined based on the professional achievement and academic achievement dimensions proposed in the collegiate learning motivation assessment tool developed by Chinese scholar Hou Xiaobing (2019). Specifically, two additional dimensions - family support and school support - were incorporated into the theoretical framework. The final instrument comprised 16 systematically designed items distributed across these four distinct dimensions, each corresponding to specific theoretical constructs in motivation measurement. The measurement tool uses the 5-level Likert scoring method for data statistics, These range from 1 to 5, with 1 being the lowest and 5 being the highest.

(2) Learning Engagement Measurement Tools

The learning engagement measurement tool for pre-service teachers in this study adopts the learning engagement measurement tool compiled by Schaufeli (2002), of which Zhao Ming translated the measurement tool into the Chinese version.[5] It was found that in the current research in the field of learning engagement, the learning engagement scale compiled by Schaufeli (2002) is recognised by most researchers and has been widely used. The scale has three dimensions of vigour, commitment and absorption and consists of 17 questions. The instrument was further revised in accordance with the practical circumstances of the target participants. Each dimension maintained four items, culminating in a 12-item scale structured across these dimensions.The measurement tool uses the 5-point Likert scoring method for data statistics, These range from 1 to 5, with 1 being the lowest and 5 being the highest.

(3) Teaching Efficacy Measurement Tools

The measure of teaching self-efficacy used in this study was created by Pintrich and DeGroot in 1990. They divided teaching self-efficacy into two independent dimensions: general learning ability self-efficacy and personal learning behaviour self-efficacy.The teaching self-efficacy measurement tool has two dimensions. The measurement tool uses the 5-point Likert scoring method for data statistics, These range from 1 to 5, with 1 being the lowest and 5 being the highest.

(4) Reliability Test of Measurement Tools

The reliability analysis (Cronbach' Alpha, $\alpha$) of the instruments for measuring the learning motivation, learning engagement and teaching effectiveness of normal students showed that the α values of the vocational achievement dimension were $\alpha$ = 0.877, the academic achievement dimension were $\alpha$ = 0.876, the family interest dimension were $\alpha$ = 0.869, the vigour dimension were $\alpha$ = 0.872, the commitment dimension were $\alpha$ = 0.876, the family interest dimension were 876, the family interest dimension was $\alpha$ = 0.869, the vigour dimension was α = 0.872, the commitment dimension was $\alpha$ = 0.884, the absorption dimension was $\alpha$ = 0.880, the personal teaching effectiveness dimension was $\alpha$ = 0.953 and the general teaching effectiveness dimension was α = 0.949. The α values of all dimensions were greater than 0.8, indicating that these instruments have good reliability. (The results are consistent with Table 1).

Table 1: Reliability Analysis of Learning Motivation, Learning Engagement and Teaching Efficacy of Normal School Students

| Object | Indicators | Number of questions | $\alpha$ |
|---|---|---|---|
| Learning Motivation | Professional achievement | 5 | 0.877 |
| | Academic achievement | 5 | 0.876 |
| | Family interests | 3 | 0.869 |
| | Total score | 13 | 0.876 |
| Learning Engagement | Vitality | 6 | 0.872 |
| | Dedication | 5 | 0.884 |
| | Focus | 7 | 0.880 |
| | Total score | 18 | 0.885 |
| Teaching Efficacy | Personal teaching efficacy | 11 | 0.943 |
| | General educational efficacy | 11 | 0.949 |
| | Total score | 22 | 0.912 |

## 3. Research Results

### 3.1. Analysis of the current status of various variable levels

The analysis of the learning motivation of the normal students shows that the academic achievement motivation of the normal students (M = 3.96, SD = 0.73) is the highest and the family interests motivation (M = 3.79, SD = 0.76) is the lowest. The overall level of learning motivation is above average. The analysis of the learning engagement of the normal students shows that the absorption of the normal students (M = 3.73, SD = 0.72) is the highest and the vigour (M = 3.64, SD = 0.72) is the lowest. The overall level of learning engagement is above average. The analysis of the teaching efficacy of the normal students shows that the personal teaching efficacy (M = 3.74, SD = 0.84) is the highest and the general teaching efficacy (M = 3.62, SD = 0.82) is the lowest. Overall teaching efficacy is above average. The mean value of each variable is within a reasonable

range (< 1.0 or > 4.5) and there are no variables with an excessively large standard deviation (⩾ 2.0). Overall, the levels of learning motivation, academic achievement and teaching effectiveness of the normal students are above average and there is still room for improvement. (The results are consistent with Table 2).

Table 2: Descriptive Statistical Analysis of Learning Motivation, Learning Engagement and Teaching Efficacy of Normal School Students.

| Object | Indicators | M | SD | Kurtosis | Skewness |
|---|---|---|---|---|---|
| Learning motivation | Professional achievement | 3.96 | 0.73 | 0.588 | -0.749 |
| | Academic achievement | 3.94 | 0.73 | 0.851 | -0.833 |
| | Family interests | 3.79 | 0.76 | -0.004 | -0.439 |
| | Total score | 3.90 | 0.61 | 0.048 | -0.678 |
| learning engagement | Vitality | 3.64 | 0.72 | 0.237 | -0.595 |
| | Dedication | 3.71 | 0.71 | 0.820 | -0.713 |
| | Focus | 3.73 | 0.72 | 0.541 | -0.615 |
| | Total score | 3.69 | 0.59 | .0.867 | -0.799 |
| Teaching efficacy | Personal teaching efficacy | 3.74 | 0.84 | -0.403 | -0.497 |
| | General educational efficacy | 3.62 | 0.82 | -0.547 | -0.357 |
| | Total score | 3.68 | 0.74 | -0.446 | -0.549 |

Through descriptive statistical analysis, it was found that the absolute value of skewness of learning motivation was between 0.439 ~ 0.749, and the absolute value of kurtosis was between 0.004 ~ 0.851. The absolute value of the skewness of learning engagement was between 0.595 ~ 0.799, and the absolute value of the kurtosis was between 0.237 ~ 0.867. The absolute value of the skewness of teaching effectiveness was between 0.357 ~ 0.549, and the absolute value of the kurtosis was between 0.403 ~ 0.547. From the absolute value of skewness and the absolute value of kurtosis of each variable, it can also be seen that they are basically within the reasonable range of -7 to +7. Therefore, it is believed that all the data conform to the normal distribution. Based on the above results, it can be assumed that these variables have no collinearity problem and all data conform to the characteristics of normal distribution. Therefore, the following path analysis can be carried out. (The results are consistent with Table 2).

### 3.2. Correlation Analysis of Normal Students' Learning Motivation, Learning Engagement and Teaching Efficacy

Table 3: Correlation Analysis Results of Learning Motivation, Learning Engagement and Teaching Efficacy of Normal School Students.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Total score of learning motivation | - | | | | | | | | | |
| 2. Professional achievement | 0.802** | - | | | | | | | | |
| 3. Academic achievement | 0.828** | 0.500** | - | | | | | | | |
| 4. Family interests | 0.823** | 0.475** | 0.533** | - | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5. Total score of learning engagement | 0.416** | 0.327** | 0.349** | 0.344** | - | | | | | |
| 6.Vitality | 0.411** | 0.303** | 0.368** | 0.337** | 0.840** | - | | | | |
| 7.Dedication | 0.293** | 0.243** | 0.240** | 0.236** | 0.817** | 0.533** | - | | | |
| 8.Focus | 0.328** | 0.265** | 0.258** | 0.281** | 0.826** | 0.549** | 0.501** | - | | |
| 9.Total score of teaching efficacy | 0.406** | 0.362** | 0.320** | 0.315** | 0.382** | 0.401** | 0.267** | 0.280** | - | |
| 10.Personal teaching efficacy | 0.394** | 0.359** | 0.309** | 0.299* | 0.351** | 0.379** | 0.244** | 0.247** | 0.891** | - |
| 11.General educational efficacy | 0.328** | 0.283* | 0.260* | 0.261** | 0.328** | 0.333** | 0.231** | 0.250** | 0.888** | 0.582.** |

Note: * indicates significance at 0.05 level, ** indicates significance at 0.01 level.

The correlation analysis of normal students' learning motivation, learning engagement and teaching effectiveness shows that the r value ranges from 0.231 to 0.891, and all variables show a significant positive correlation ($p < 0.05$). Meanwhile, the correlation analysis of all dimensions shows that all dimensions have a significant positive correlation ($p < 0.05$). Among them, the correlation between vigour and general teaching efficacy is the lowest (r = 0.231), and the correlation between personal teaching efficacy and teaching efficacy is the highest (r = 0.891). None of the correlation coefficients are too large, which is standard.

### 3.3. Mediating Effect Analysis

(1) Hypothesized Model Fit Verification

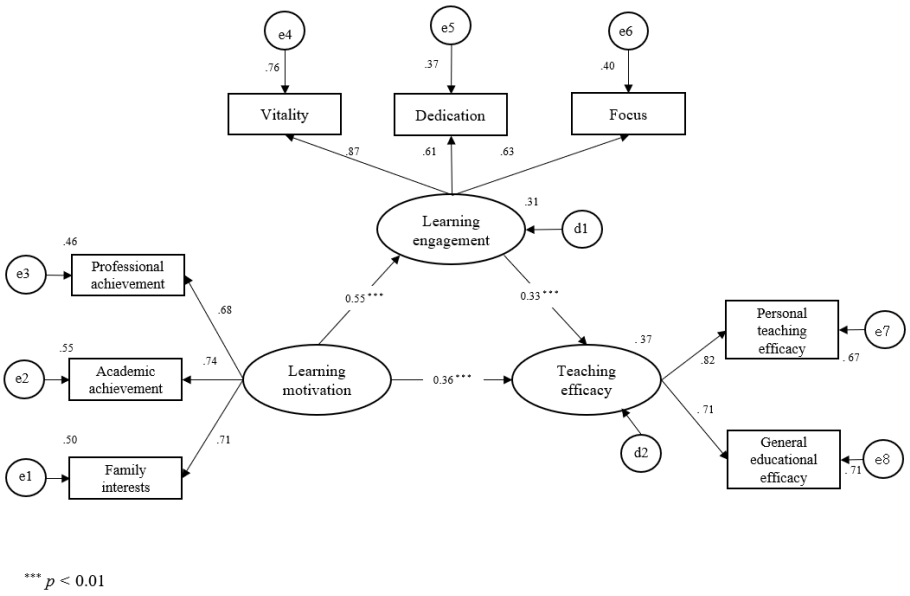


Figure 1:Results of Model Fit

The fit of the hypothesised model was checked and the specific results are as follows:① CMIN(df, $p$) is 27.486 (df = 16, $p$ <0.05). Although these data exceed the norm, they are considered to be influenced by the sample size and can be accepted.② Q(NC) is 1.718. Although this data

exceeds the standard value, it is less than 5 and can be considered a marginally acceptable result.③ GFI is 0.987, which meets the standard value.④ TLI is 0.992, which meets the standard value. CFI is 0.996, which meets the standard value.⑥ RMSEA (90% confidence interval) is 0.025 (0.006 - 0.041), which meets the standard value.⑦ SRMR is 0.0161, which meets the standard value. (The results are consistent with Figure 1).

(2) Mediating Effect Analysis

This study adopts the confidence interval method for mediation effect analysis. Based on the revised model, a structural equation model for mediation effect analysis is constructed using AMOS 24.0 software. Using the bootstrap function, 2,000 analyses are conducted on the research samples, and the mediating effect of the revised model is judged within the 95% confidence intervals. Since AMOS cannot directly output the mediation effect results, the mediation effect must be judged by comparing different output results. Therefore, the formula function is used during the operation to output the specific results.

The assessment of the mediation effect is divided into three parts:① Check the overall effect. If the coefficient value does not contain 0 within the 95% confidence interval, there may be a mediating effect. If it contains 0, the judgment is completed. Check the indirect effect. If the coefficient value is not 0 within the 95% confidence interval and the P value is significant, there is a mediated effect. Check the direct effect. If it is smaller than the total effect but significant, there is a partial mediation effect. If the result is not significant, there is a full mediation effect.

According to the structural equation model, the path names are set. The path from learning motivation to learning engagement is set as a, the path from learning engagement to teaching effectiveness is set as b, the path from learning motivation to teaching effectiveness is set as c, and the mediating effect from learning motivation to learning engagement to teaching effectiveness is a * b + c.

Table 3:Results of the Mediating Effect Analysis of Learning Motivation, Learning Engagement and Teaching Efficacy of normal college student.

| Path name | Estimate | 95% Lower | 95% Upper | *p* |
|---|---|---|---|---|
| Standardized total effect | 0.691 | 0.590 | 0.788 | 0.010 |
| Standardized direct effect | 0.460 | 0.339 | 0.564 | 0.009 |
| Standardized indirect effect | 0.230 | 0.172 | 0.315 | 0.007 |

Through the analysis of the bootstrap data, the following conclusions are drawn: (1) The 95% confidence interval of the mediating effect of learning motivation → learning engagement → teaching efficacy is 0.590 - 0.788 ($p < 0.05$), and 0 is not included in the interval. Therefore, it can be assumed that learning engagement plays a partial mediating role in the process of the influence of normal students' learning motivation on teaching efficacy.

## 4. Conclusions

The main conclusions of this study are as follows:

(1) The levels of learning motivation, learning engagement and teaching efficacy of normal students are above average, but there is still room for improvement.

(2) Normal students' learning motivation can have a direct positive effect on learning engagement, learning engagement can have a direct positive effect on teaching efficacy, and learning motivation can have a direct positive effect on teaching efficacy.

(3) In the process of the influence of normal students' learning motivation on teaching efficacy, learning engagement may have a partial mediating effect.

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