Analysis of the Current Situation of Teachers' Innovative Work Behavior in China's Private Universities Under the Background of E-Education

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Abstract. With the rapid development of modern e-Education and information technology, society has put forward higher requirements for teachers' innovative ability and innovative behavior. The innovation level of private universities and the innovation of teachers are relatively weak. Innovation is an important factor that determines whether an organization can develop sustainably. Private universities must strengthen teachers' innovation, thereby promoting the innovation and development of private universities. This study conducted a survey of 61 teachers from private universities in Guangzhou, using SPSS 26.0 independent sample t-test and one-way ANOVA analysis method to quantitative analysis of the current status of teachers' innovative work behavior, and finally proposed suggestions for improving teachers' innovative work behavior, in order to promote the innovative development of private universities in China.

Keywords: innovation, e-Education, information technology, teachers' innovative work behavior, private universities, t-test, ANOVA

1 Introduction

Innovation is the core competitiveness of school development. Teachers are the initiative to promote the innovation and development of schools. The quality and level of teachers' innovative work in private universities directly affect the development of schools and the growth of students.

Zhang and Wang (2015) believe that teachers' innovative work behavior is mainly innovative teaching behavior, that is, when teachers face diverse teaching situations, they introduce new concepts, methods, or creative ideas in teaching activities to assist students in meaningful learning, and at the same time it also encourages others to support, participate in and carry out planning. [1] Li (2016) believes that teachers' innovative work behavior is to actively change the concept of education and teaching in teachers, actively design and promote novel or creative teaching programs, and promote the improvement of teaching quality through the actual application in their work. [2] Janssen (2003), Scott and Bruce (1994), Zhou and George (2001) believe that innovative work behavior includes three main stages, namely the generation of

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innovative ideas, the promotion of innovative ideas, and the realization of innovative ideas. [3] [4][5]

At present, the innovation of teachers in Chinese private universities is not high, and the level of innovation is relatively low. Therefore, it is necessary to conduct an in-depth investigation into the current situation of innovative work behavior, analyze the problems, and propose effective measures to promote the innovative development of teachers in private universities.

2 Data Analysis

In order to ensure the reliability and validity of the questionnaire, this study had done a large amount of literature review in the questionnaire design. According to the characteristics of teachers in Chinese private universities, this study made appropriate adjustments and improvements to the scale based on the questionnaires of Lukes and Stephan (2017), De Jong (2007), Janssen (2000), and Win (2021), forming a survey questionnaire suitable for this study with certain content validity. [6] [7] [8] [9] This questionnaire includes three dimensions, which are Creation of Innovative Ideas, Promotion of Innovative Ideas, and Application of Innovative Ideas. This study investigated the basic information and innovation status of teachers by issuing questionnaires to teachers in private universities. In terms of reliability, this study used Cronbach's α to estimate internal consistency. It can be seen from the analysis results that the Cronbach's α of the 3-dimentional questionnaire is greater than 0.9, and the total reliability is as high as 0.95 or more. It proves that the reliability of this study questionnaire is very good. In this study, a total of 63 survey questionnaires were distributed for pilot test, and 61 valid questionnaires were collected, and the effective recovery rate was 96.83%. The questionnaire content covers the basic information, innovation idea, and innovation ability of the respondents.

2.1 Descriptive statistics table

According to the questionnaire survey, the results of different demographic variables are shown in Table 1.

Table 1. Descriptive Statistics of Teacher Characteristic Variables (n=287)

Variables	Attributes	Frequency (percentage)	Average score of teachers' innovative work behavior
Job position	Full-time teacher	244（83.28%）	82.52
	Department administrator	18（6.14%）	76.94
	Counselor	31（10.58%）	70.94
Gender	Male	91（31.06%）	80.16
	Female	202（68.94%）	81.31
Age	≤25 years old	53（18.09%）	80.06
	26-35 years old	153（52.22%）	84.35
	36-45 years old	50（17.06%）	74.18
	46-55 years old	25（8.53%）	79.68
	≥56 years old	12（4.10%）	72.50

Academic degree	Junior college or Bachelor	77（26.28%）	81.26
	Master	196（66.89%）	80.69
	Doctor or above	20（6.83%）	82.30
Professional title	Ungraded	68（23.21%）	83.62
	Junior	47（16.04%）	83.79
	Intermediate	122（41.64%）	79.48
	Deputy Senior	36（12.29%）	78.72
	Senior	20（6.82%）	78.20
College age	≤3 years	104（35.49%）	81.30
	3-5 years	90（30.72%）	83.49
	5-10 years	47（16.04%）	81.89
	10-20 years	43（14.68%）	74.21
	≥20 years	9（3.07%）	78.89
Total working age	≤3 years	68（23.21%）	83.00
	3-5 years	90（30.72%）	83.89
	5-10 years	48（16.38%）	81.33
	10-20 years	55（18.77%）	76.35
	≥20 years	32（10.92%）	75.69

Data source: This questionnaire survey collated

2.2 Difference analysis

This study used SPSS 26.0, involving independent sample t-tests and one-way ANOVA analysis, to perform differential analysis of different teachers' characteristics in the cognition of teachers' innovative work behavior. The results are shown in Table 2.

Table 2. Analysis of the Differences in Teacher's Cognition of Innovative Work Behavior in Different Teacher Characteristics

Variables	t / F	Post - hoc
Job position	11.855***	Full-time teacher > Counselor
Gender	-0.671	
Age	7.506***	26-35 years old > under 25 years old, 26-35 years old > 36-45 years old, 26-35 years old > over 56 years old, under 25 years old > 36-45 years old
Academic degree	0.156	
Professional title	2.035	
College age	3.760***	3-5 years > 10-20 years，5-10 years > 10-20 years，less than 3 years > 10-20 years
Total working age	7.179***	3-5 years > 10-20 years，3-5 years > over 20 years，less than 3 years > 10-20 years，less than 3 years > over 20 years

Data source: This questionnaire survey collated

From Table 2, it can be seen that there is no significant difference in teachers' innovative work behavior based on gender, educational background, and professional titles. However, there are significant differences in teachers' innovative work behavior due to differences in job position,

age, college years, and total working age. The job position analysis results indicate that the work content of full-time teachers engaged in teaching and research is highly related to innovation, and they often think more about how to innovate and how to integrate innovation into teaching and research. The analysis results of age, college age, and total working age indicate that young teachers who have worked for several years are relatively familiar with the job content, stable in their work, and have the energy and experience to think innovation. They have a relatively strong sense of innovative idea and innovative behavior.

2.3 Analysis of teachers' innovative work behavior

This questionnaire used the Likert 5-point scale, representing Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree from 1 to 5. Investigation results on teachers' innovative work behavior are shown in Table 3.

Table 3. Statistical Table of Investigation Results on Teachers' Innovative Work Behavior

Results / Dimensions	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5
Creation of Innovative Ideas	0.00%	1.59%	12.70%	59.68%	26.03%
Promotion of Innovative Ideas	0.00%	3.40%	36.28%	40.59%	19.73%
Application of Innovative Ideas	0.00%	1.36%	18.82%	51.48%	28.34%

Source: Sorted out in this survey

According to the survey results, 85.71% of teachers choose 4 and 5 when evaluating the Creation of Innovative Idea dimension, which indicates that private university teachers have strong innovative ideas in their work. They will change their teaching methods according to the students' characteristics, and continue to think and explore new interactive methods and prepare teaching materials. When evaluating Promotion of Innovative Ideas, 40.59% of the number of teachers selected 4, which means that more than one-third of the teachers are willing to promote their own innovative ideas, and hope to obtain the support of other teachers and encourage them to participate in promoting their innovations. When evaluating the Application of Innovative Ideas dimension, 79.82% of teachers chose 4 and 5 to prove that teachers are willing to apply innovation in their work as long as they have innovation. They will try their best to teach students new knowledge in the classroom, innovate teaching methods to make it easy for students to remember, and guide students to correctly apply the knowledge and skills in practice. Generally speaking, teachers in private universities have strong innovative motivation and behavior, and constantly cultivate and improve students' innovative thinking. However, the innovation of teachers in private universities is influenced by the soft environment (leadership style, innovation atmosphere, personalized teaching system, etc.) and the hard facilities (modern information technology and equipment, educational multimedia, etc.).

3 Improvement Measures

An outstanding problem in the teachers' innovative work in private universities is that their innovative awareness is relatively weak. At the same time, the high pressure on teachers of private universities from working and the lack of time and space for innovation have also weakened their investment and enthusiasm for innovation. The role of modern information technology in the teaching process is becoming more and more obvious. The ability and quality of teachers to use modern information technology are increasingly important to improve teachers' innovative work behavior.

3.1 Promote transformational leadership and strengthen educational information technology construction

Most of the leaders of China's private universities come from public universities. They bring relatively mature management experience, leadership methods and decision-making sometimes conservative and traditional. However, the development of education is rapidly changing, and education managers must have a spirit of breakthrough and innovation in order to lead private universities to develop and grow. Therefore, China's private universities should promote transformational leadership, through innovative management models and leadership styles, create an innovative culture and innovative atmosphere, optimize modern information technology conditions, stimulate the innovative awareness and the use of computer technology, and promote innovative interaction and cooperation between teachers and students.

3.2 Reinforce the cultivation of teachers' innovative awareness and improve the level of e-Education

Private universities should reinforce teachers' innovative education and increase their awareness and attention to innovation. The education of teachers' innovative awareness should run through all stages of teachers' career, including teacher training, teacher evaluation, and promotion of teachers' professional titles. At the same time, private universities should cultivate teachers' innovative consciousness in all aspects, including teaching, scientific research, and management, to provide more learning and communication opportunities for teachers, and stimulate their enthusiasm and motivation for innovation. Private universities should focus on improving teachers' innovative abilities, and improve teachers' innovative thinking, methods, and practical abilities through innovative project support, innovative team building, and innovative teaching competitions in order to promote the transformation and application of teachers' innovative achievements. However, it is necessary to strengthen the evaluation and recognition of teachers' innovative abilities and encourage them to actively participate in innovation activities.

4 Conclusions

This study used SPSS 26.0 to analyze the situation of teachers' innovative work behavior. The using methods are independent sample t-tests and one-way ANOVA analysis. The innovative development of private universities in China is essential, and the improvement of teachers' innovative work behavior in private universities is even more urgent. Private universities should create an innovative environment for teachers and encourage teachers to innovate.

Teachers in private universities should consciously cultivate their innovative thinking and actively participate in the activities of innovation. At the same time, teachers in private universities should take the initiative to practice, apply modern education information technology, and constantly try to improve e-Education.

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