

Retraction

Retracted: Gender Differences in Teaching and Research Performance of University Teachers Based on Discrete Data Analysis

Discrete Dynamics in Nature and Society

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] H. Ding, "Gender Differences in Teaching and Research Performance of University Teachers Based on Discrete Data Analysis," *Discrete Dynamics in Nature and Society*, vol. 2021, Article ID 5066668, 9 pages, 2021.

Research Article

Gender Differences in Teaching and Research Performance of University Teachers Based on Discrete Data Analysis

Hong Ding 

Zhejiang University of Finance and Economics, Hangzhou 310018, China

Correspondence should be addressed to Hong Ding; dinghong@zufe.edu.cn

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Numerous studies have found that there were obvious differences between men and women in research performance, but there is little analysis on teaching. At the same time, the existing studies did not classify the teacher sample but only analyzed the overall sample. This study takes both teaching and research into account, and the sample teachers from a certain university in China are divided into three groups such as outstanding teachers in teaching, outstanding teachers in research, and weak teachers in both teaching and research through cluster analysis based on the discrete data analysis of teaching and research workload from 2018 to 2020. The gender differences in teaching and research performance of male and female teachers in every group are analyzed. It is found that there are obvious differences between male and female teachers in the three groups. By analyzing the correlation between male and female teaching and research performance and gender, age, education, and degree of three groups, it is also found that there are differences between men and women in the correlation of individual factors such as degree and type of graduation university. Based on the results, this paper provides several policy recommendations.

1. Introduction

Nowadays, the world has fully entered the era of knowledge economy. Vigorously developing higher education has become an important measure for countries around the world to improve their own competitiveness. More and more women have entered the field of higher education and made great contributions to the development of higher education. According to statistics on the website of the Ministry of Education of the People's Republic of China, as of 2017, the total number of full-time teachers in ordinary colleges and universities in China was 1.63 million, of which 49.83% were full-time female teachers, and male and female teachers have nearly remained the same. Although more and more women are entering the field of higher education, due to the constraints of historical, physiological, and social factors, women are in a disadvantaged position in most professional fields. Gender differences in higher education performance have become a common theme in higher education research or sociological research. The quantity and quality of scientific research and teaching output are often key indicators

to measure the level of universities, so the differences in performance between men and women can be compared from the two aspects of teaching and research.

In the existing research, scholars compared the performance differences between men and women from the perspective of scientific research, such as the differences in research output and research cooperation. For example, Sax et al. [1] analyzed the differences in research output between men and women from gender and family-related factors. The research showed that factors affecting faculty research productivity were nearly identical for men and women, and family-related variables, such as having dependent children, exhibit little or no effects on research productivity. Abramo et al. [2] analyzed the differences between men and women from the perspective of research cooperation. The analysis showed that women researchers registered a greater capacity to collaborate in all the forms analyzed, with the exception of international collaboration, where there was still a gap in comparison to male colleagues. Yuan [3] analyzed the gender differences in the research output of university teachers. She believed that family burden and cooperation

were the key variables affecting teachers' research output. Compared with male teachers, female teachers would spend more time on research in order to balance the negative impact of family burden. The proportion of female teachers participating in cooperation was lower than that of male teachers, which was also one reason why their output was lower than that of male teachers. Xie and Shauman [4] pointed out that gender differences in research productivity stemmed from sex differences in structural locations and responded to the secular improvement of women's position in science. Cole and Zuckerman [5] pointed out that it was more difficult for female researchers to get promotion opportunities than male researchers. This phenomenon was becoming more and more obvious in large research institutions. From the perspective of career development, it is more related to the field of sociology.

Teaching and research are the main responsibilities of college teachers. Previous studies mostly focused on the analysis of the influencing factors of research behavior but did not analyze the teaching behavior at the same time. This study takes both teaching and research into account and analyzes the differences between men and women in teaching and research from multiple factors such as age, professional title, degree level, and discipline based on empirical data. The existing studies did not classify the teacher sample but only analyzed the overall sample, but this research will use cluster analysis methods to divide teachers into three categories such as outstanding teachers in teaching, outstanding teachers in research, and weak teachers in both. Then, the three categories of personnel will be compared and analyzed to explore the specific conditions of various teacher groups' teaching and research. This is another innovation of this study, and group analysis can provide a more accurate reference for refined system design.

After reviewing the relevant literature in part 2, in the next part, we describe the data used to be analyzed. In Section 4, we show the results obtained. The results show that the teaching workload and research workload of men outstanding in teaching are significantly higher than those of women. There is no significant gender difference in the teaching workload of teachers outstanding in research, but the level of research workload of men is significantly higher than that of women. There is no significant gender difference in the teaching workload of teachers weak in both, but the level of research workload of men is significantly higher than that of women. There is a significant positive correlation between male teaching reform research and age, while female teachers have no significant correlation. The teachers with a higher degree have less teaching workload. But female teachers are mainly reflected in the workload of guiding students. The type of female teachers' graduation university is significantly related to the output of research workload, while the male has no significant correlation. In Section 5, we provide several policy recommendations.

2. Literature Reviews

With the gradual deepening of the idea of equality between men and women, the gap between women and men in terms of employment quantity and employment structure is

narrowing. So, are there gender differences in job performance and career development? Liao [6] believed that there were four models for women's career development. The one-stage model was that the career started from the beginning of work and lasted until retirement. Although women spent more time in their family and children during marriage and childbearing, they would return to normal after a period of events. Most Chinese women belonged to this type. The two-stage model had large differences in occupational participation before and after marriage, and the premarital occupational participation rate was high and rapidly decreased after marriage. The three-stage model was that women had a high employment rate before marriage and childbirth, interrupted work after marriage and childbirth, and reparticipated in work after their children had grown up. The multistage model was that women did not regard participation in work as an important matter and chose to enter or quit their career according to their own situation and preferences, and the times were more frequent. Deng [7] believed that women's careers generally presented two peaks and one trough. One peak was about 6–8 years after women's employment and before women's employment without childbirth. Another peak was more than ten years after the age of 36. At this time, the children were almost growing up or could be entrusted. Women were still full of energy and experience. Women's career was usually brilliant in this period. A trough was that, between these two peaks, usually eight years of childbearing and raising children, women's career development was at a stage of stagnation or even decline. The peak underestimation or multistage of female careers was due to physiological, marriage, and childbirth reasons, while men did not need to invest as much time and energy into their families or children as women. Therefore, men's career may mostly belong to a one-stage model, and the trough phenomenon caused by marriage and childbirth was unlikely to occur. Yi et al. [8] found that 75% of the respondents believed that excessive family pressure had affected their career development through a survey of female teachers in a university. At the same time, few women could effectively alleviate the pressure of family life through work or work through family life. According to the interview with the interviewees, the dual pressure of work and family was becoming a heavy burden on the development of women in universities, especially in family life. The pressure of women was growing rapidly, and the core responsibilities such as children's education, housework, and family relationship management were often unilaterally imposed on women. Thus, it further worsened the relationship between career development and family responsibility and promoted the increasing survival pressure of women.

In the field of higher education, does gender affect the output of scientific research or teaching work? If it does, what kind of impact does it have? Some scholars have conducted research on this, and the research mainly focused on the differences in research work. The problem of gender inequality in the academic labor market was mainly reflected in the low status of women in the field of science, which had been concerned by the academic community for a long time [9]. In the 1980s, American scholars noticed that there was

an obvious problem of “underrepresentation” of women in American science. The number of women in science and engineering was significantly lower than that of men, and they were in a more unfavorable position in terms of position, salary, and reputation [10]. Cole and Zuckerman [5] pointed out that there were gender differences in scientific research. They believed that it was more difficult for female researchers to get promotion opportunities than male researchers. This phenomenon was becoming more and more obvious in large research institutions, which was the mystery of the research output that they put forward. Yuan [3] believed that the scientific reputation of female scientists was generally not as high as that of male scientists, and their work was often ignored. Even among world-class scientists, such as Nobel laureates, women cannot compete with men.

Regarding why gender affects scientific research capabilities, a common understanding is that there are differences in time investment between men and women. Especially after marriage and childbirth, women spend more time on family and children than men, resulting in less time invested in research and lower research output. Yuan [3] found that family burden and cooperation were the key variables affecting teachers’ research output through the investigation of teachers in a research university. The influence of family burden on teachers’ research output was completely realized through the mediating effect of work effort. Compared with male teachers, female teachers would spend more time in research in order to balance the negative effects of family burden. Sun [11] made statistical analysis on the age, gender, education background, degree, professional title, scientific research paper achievements, project achievements, and other data of all researchers in a university. It was found that there was a shortage of female high-level talents and the output of female high-level research was low.

Many scholars have done a lot of research on gender differences in research performance, but there are few studies on gender differences in teaching. This may be because male and female teachers both agree on the identity of teachers, but there are differences in the identity of scholars. Wang and Song [12] believed that most female teachers took the initiative to identify with their motherhood, care, and affinity given by the society, so they felt that teacher identity and teaching work were highly isomorphic with their essence. But there was an obvious sense of alienation towards scholar status and scientific research work. This cognition had profoundly affected the identity and identity establishment of female teachers in the university. In their narration to the interviewees, they found that, even in research universities, most of the female teachers paid more attention to their own teacher status and generally had little subjective willingness to do academic work. In addition, the current related researches basically focused on the impact of marriage and childbirth, family, and other conditions on women, and there is little comparative analysis on the impact of age, professional title, degree, graduation university, and other objective factors shared by men and women.

The distribution of research work of university teachers is obviously structural. The Pareto Principle (the 80–20 rule) is also applicable to the distribution of research output which states that 20% of research workers contribute to 80% of scientific research output. Most of the previous studies focused on the analysis of differences in the research performance of university teachers, and the data analysis was basically based on the overall teacher sample. However, the university needs to be more precise when formulating policies. It hopes to formulate different management and incentive terms for different types of teachers. At present, there are few studies on gender differences in teaching performance. Yu [13] believes that Pareto Principle could also be applied to the process of teaching management. In the large-scale and complex teaching management work, key things should be grasped, core problems should be solved, and backbone forces should be motivated. There is still room to improve teachers’ vitality and efficiency in teaching management.

Based on the workload data of teaching and research of Z University from 2018 to 2020, this paper will divide the sample teachers into three groups such as outstanding teachers in teaching, outstanding teachers in research, and weak teachers in both teaching and research through cluster analysis and analyze the gender differences in the teaching and research performance of every group. Every group may have its own work goals and work abilities, and the influencing factors of their teaching and research work may also be different. So, the results obtained by group research will be more accurate. The research conducts a correlation analysis of the teaching and research performance of men and women of various groups with professional titles, gender, age, academic degrees, and so on in order to get the influencing factors of classified teaching and research behavior and provide a more accurate reference for policy formulation.

3. Data Sources

Z University in China established a quantitative evaluation mechanism for teaching and research as early as 2008 and set quantitative standards for teaching work such as classroom teaching and research work. Among them, the teaching workload includes classroom work, tutor work, guiding students outside the classroom, teaching rewards and punishments, and teaching construction and awards. The research workload includes research papers, government-supported projects, projects from enterprises, books, awards, and achievement transformation. On the basis of quantification, the school makes a comprehensive evaluation of teachers’ performance.

Based on the discrete data of teaching and research workload from 2018 to 2020 in Z University, this paper will divide the sample teachers into three groups such as outstanding teachers in teaching, outstanding teachers in research, and weak teachers in both teaching and research through cluster analysis and analyze the gender differences in the teaching and research work of every group. There are 647 valid data including the teaching workload and research

workload of teachers in teaching and research posts of Z University in the past three years. The teaching staff covers all teachers engaged in teaching and research work in the university. This university is a provincial key construction university, has the qualification of granting the doctoral degree, and has quite a good level of teaching and research. Therefore, the data has good comprehensiveness and representativeness.

4. Empirical Results and Analysis

There are mainly ten colleges in Z University such as Public Finance and Taxation, Law, Business Administration, Public Administration, Accounting, Finance, Economics, Data Sciences, Foreign Languages, Information Management, and Artificial Intelligence. Figure 1 shows the average teaching and research workload of each college. In most colleges, the teaching workload of each college is significantly higher than the research workload, and there are obvious differences among colleges. Figure 2 shows the average teaching workload of male and female teachers of each college. There are differences in the workload of teachers of the same gender among colleges. Figure 3 shows the average research workload of male and female teachers of each college. In most colleges, the average research workload of male teachers is different from that of female teachers, and there are significant differences in the workload of teachers of the same gender among colleges. Therefore, the division needs to analyze male teachers and female teachers in every college.

Table 1 shows the composition of data samples, describing the distribution of male and female teachers in age, professional title, degree, and type of graduation university. It is not only the composition of samples but also the statistical description of variables. As shown in the table, the average age of female teachers is about 2 years lower than that of men. The proportion of female teachers with lecture title is much higher than that of male teachers, but the proportion of female teachers with professor title is much lower than that of male teachers. The proportion of female teachers with PhD is much lower than that of male teachers. However, the proportion of male and female teachers who graduated from first-class universities and first-class discipline universities is basically the same.

4.1. Analysis of the Difference in the Workload of Male and Female Teachers in Teaching and Research. Table 2 analyzes the difference in teaching workload and research workload in the total number of teachers according to gender by adopting the Mann–Whitney U test method. The results show that the two-sided test probability of teaching workload is 0.859, which is greater than 0.05, so there is no significant difference in teaching workload for female and male teachers. The two-sided test probability of research work is less than 0.001. It means that there is a significant difference in research workload. The rank average value of men's research workload is 356.21, and women's is 284.35. It can be considered that men's research workload is more than women's research workload.

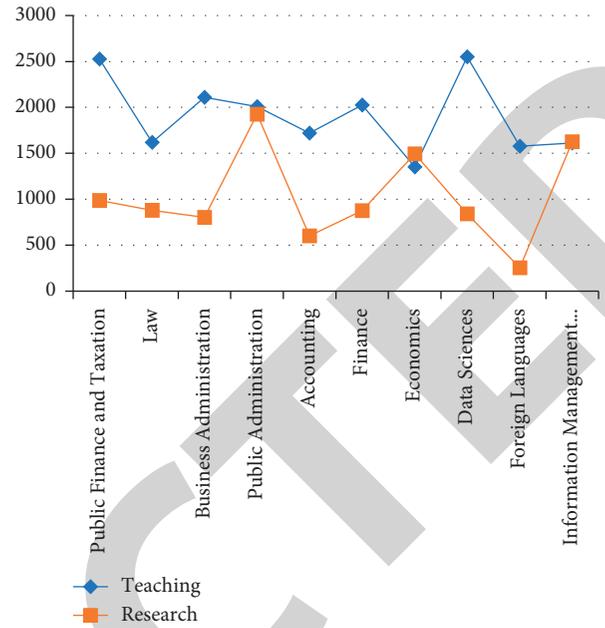


FIGURE 1: Average workload of every college in Z University.

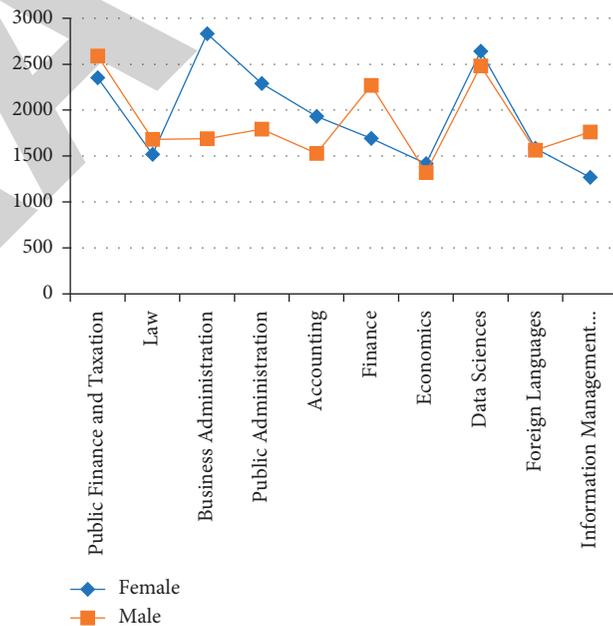


FIGURE 2: Average of total teaching work of male and female teachers of each college.

4.2. Cluster Analysis of Teachers' Teaching Ability and Research Ability. Cluster analysis is an important method of statistical analysis. As an important method of data mining research, it is also known as group analysis. It is a process of dividing multiple objects with similar properties into multiple classes. Class refers to the collection of similar elements, similar elements are classified into the same category, and dissimilar elements are classified into different categories. Its basic idea is to analyze the affinity of sample data according to the characteristics of variables so as to divide the samples into corresponding categories. This research divides the sample

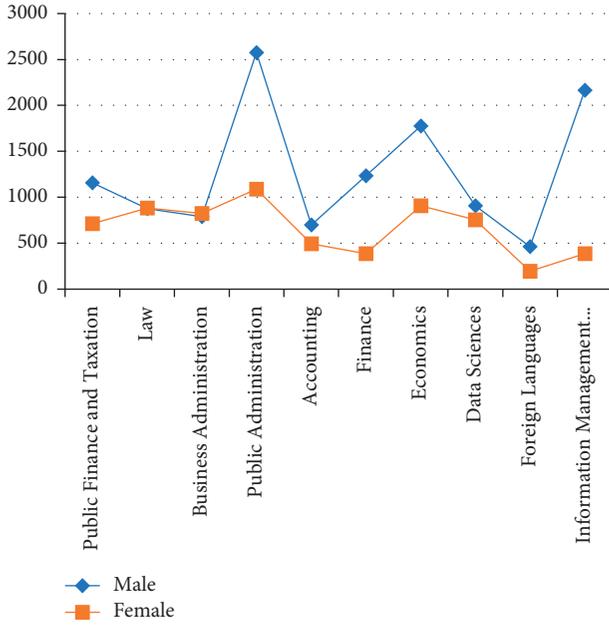


FIGURE 3: Average of total research work of male and female teachers of each college.

TABLE 1: Sample composition.

	Statistical value	
	Male	Female
Gender	44.71	42.54
Age		
Professional title		
Lecturer and below	28.29%	43.45%
Associate professor	38.66%	42.07%
Professor	33.05%	14.48%
Degree		
Bachelor	5.32%	4.48%
Master	12.32%	34.14%
Doctor	82.36%	61.38%
Type of graduation university		
First-class universities	53.78%	53.79%
First-class discipline universities	21.29%	15.86%
Foreign universities	6.44%	8.28%
Other ordinary universities	18.49%	22.07%

TABLE 2: Rank-sum test of overall teaching and research workload.

Teaching workload			Wilcoxon two-sample rank-sum test	
	$M (P_{25} \sim P_{75})$	Mean rank	Z	P
Male	1613 (902.5~2507.5)	322.83	-0.177	0.859
Female	1630 (968.75~2497.75)	325.44		
Research workload			Wilcoxon two-sample rank-sum test	
	$M (P_{25} \sim P_{75})$	Mean rank	Z	P
Male	550 (25~1534)	356.21	-4.916	≤0.001
Female	172.5 (0~780.25)	284.35		

$P \leq 0.05$ significance level.

teachers into three categories such as outstanding teachers in teaching, outstanding teachers in research, and weak teachers in both teaching and research through cluster analysis. On this basis, a further detailed comparative analysis is carried out.

4.2.1. The Steps of K-Means Algorithm

Input: the number of clusters K and N sample data sets $X = \{x_1, x_2, x_3, \dots, x_n\}$.

Output: K clusters $\{S_1, S_2, S_3, \dots, S_k\}$.

Specific steps:

K objects are randomly selected from data set X as the initial clustering centers $\{h_1, h_2, h_3, \dots, h_k\}$.

Separate objects $x_i (1 \leq i \leq n)$ which are assigned to the nearest initial cluster center $c_j (1 \leq j \leq K)$ using the quadratic power of the Euclidean distance formula $\min \sum_1^m (x_{it} - c_{it})^2$, where m is the number of object attributes.

In every cluster, reselect the new cluster center c_j $c_j = (1/N_j) \sum_{x_i \in S_j} x_i$, where $j = 1, 2, 3, \dots, K$.

Repeat steps 2 and 3 until the number of cluster centers K no longer changes and ends.

4.2.2. Cluster Analysis of Teachers' Teaching and Research Ability

Step 1: data normalization

In order to facilitate the cluster analysis of teachers' teaching ability and research ability, the workload of teachers in every college is standardized according to formula (1).

$$y_i = \frac{x_i - \min_{1 \leq j \leq n} \{x_j\}}{\max_{1 \leq j \leq n} \{x_j\} - \min_{1 \leq j \leq n} \{x_j\}} \quad (1)$$

Step 2: K-means clustering

In order to clearly distinguish the teaching ability and research ability of teachers, teachers are divided into three types: outstanding teachers in teaching, outstanding teachers in research, and weak teachers in both teaching and research work. In the Matlab2012 software, through the K-means program, the teaching workload and research workload of male and female teachers in every college are clustered, and the center data and number of people of each category are obtained as shown in Table 3.

4.3. Analysis on the Difference of Teaching and Research Workload between Male and Female Teachers by Category

4.3.1. Outstanding Teachers in Teaching. In Table 4, it is an analysis of the differences between men and women in the workload of teaching and research of outstanding teachers. The results show that the two-sided test probability of the difference test of teaching workload is 0.031, which is less than 0.05. And there is a significant difference in teaching workload. The two-sided test probability of the difference test of research work is less than 0.001, and there are also significant differences in research workload. Interestingly, the level of teaching workload and research workload of men is significantly higher than that of women.

TABLE 3: Cluster analysis of teaching and research workload.

Colleges	Type	Center (male) (teaching, research)	Center (female) (teaching, research)	Number of males (females)
Public finance and taxation	Outstanding in research	0.5252, 1.0000		1 (0)
	Outstanding in teaching	0.6474, 0.0944	0.5304, 0.0566	8 (8)
	Weak in both	0.2617, 0.0507	0.1468, 0.0499	21 (8)
Law	Outstanding in research	0.4533, 0.8699	0.2916, 0.4695	2 (4)
	Outstanding in teaching	0.5617, 0.0956	0.5677, 0.0433	14 (7)
	Weak in both	0.1908, 0.0848	0.1664, 0.0724	19 (11)
Business administration	Outstanding in research	0.1901, 0.5601	0.1625, 0.6199	4 (3)
	Outstanding in teaching	0.5079, 0.1039	0.6333, 0.0768	2 (9)
	Weak in both	0.1913, 0.1075	0.2000, 0.1005	32 (10)
Public administration	Outstanding in research	0.3474, 0.7709		6 (0)
	Outstanding in teaching	0.7744, 0.2274	0.7670, 0.1317	7 (9)
	Weak in both	0.2320, 0.1199	0.3377, 0.1055	18 (16)
Accounting	Outstanding in research	0.1976, 0.5239	0.5365, 0.7101	9 (5)
	Outstanding in teaching	0.6988, 0.0477	0.6877, 0.0246	10 (12)
	Weak in both	0.2799, 0.1261	0.3097, 0.0636	22 (22)
Finance	Outstanding in research	0.3459, 0.7286		4 (0)
	Outstanding in teaching	0.7194, 0.2922	0.6402, 0.0262	9 (6)
	Weak in both	0.2678, 0.0868	0.1847, 0.0829	21 (20)
Economics	Outstanding in research	0.4898, 0.7471		3 (0)
	Outstanding in teaching	0.4631, 0.0907	0.7826, 0.1439	10 (2)
	Weak in both	0.1573, 0.0625	0.2077, 0.0488	37 (23)
Data sciences	Outstanding in research	0.2019, 0.4305	0.1765, 0.4572	10 (3)
	Outstanding in teaching	0.5496, 0.0679	0.6961, 0.1155	8 (7)
	Weak in both	0.2423, 0.0440	0.1953, 0.0850	16 (16)
Foreign languages	Outstanding in research	0.2865, 0.7317	0.3421, 0.5191	4 (7)
	Outstanding in teaching	0.9347, 0.1416	0.6110, 0.0437	3 (33)
	Weak in both	0.3499, 0.0475	0.2546, 0.0262	13 (30)
Information management and artificial intelligence	Outstanding in research	0.2432, 0.6009		9 (1)
	Outstanding in teaching	0.8667, 0.0136	0.3780, 0.0117	4 (1)
	Weak in both	0.2314, 0.0621	0.0574, 0.0463	31 (17)

4.3.2. Outstanding Teachers in Research. In Table 5, it is an analysis of the differences between men and women in the teaching and research workload of outstanding research teachers. The results show that the two-sided test probability of the difference test of teaching workload is 0.913, which is greater than 0.05. And there is no significant difference in teaching workload. The two-sided test probability of research work is less than 0.05, and there is a significant difference in research work. The level of research workload of men is significantly higher than that of women.

4.3.3. Weak Teachers in Both Teaching and Research. In Table 6, it is an analysis of the differences between men and women, weak in both teaching and research, in the teaching and research workload. The results show that the two-sided test probability of the difference test of teaching workload is 0.094, which is greater than 0.05. And there is no significant difference in teaching workload. The two-sided test probability of research work is 0.049, which is less than 0.05. And there is a significant difference in research work. The level of research workload of men is significantly higher than that of women.

4.4. Correlation Analysis of Influencing Factors of Teaching and Research Behavior. An important purpose of this research is to explore how to promote the vitality of teachers with weak teaching and research. Through the correlation analysis of the factors affecting the teaching and research behavior of male and female teachers, more precise policy recommendations can be put forward for teachers with weak in both teaching and research. Spearman correlation analysis method was used to analyze the correlation of age, professional title, degree, graduation school, and other factors affecting the teaching and research work of male and female teachers. The results can be seen in Table 7. Scientific research projects, scientific research papers, and social services (mainly projects from enterprises) are the main forms of research. In addition, in teaching work, the workload of teaching in the classroom is relatively stable, and the flexibility of teaching work is mainly reflected in guiding students and teaching reform research. Therefore, the study incorporates the above indicators into the analysis. It is found that the influencing factors of male teachers and female teachers are different. For example, there is a significant positive correlation between male teaching reform research and age, while female teachers have no

TABLE 4: Rank-sum test of teaching and research workload of teachers outstanding in teaching.

	Teaching workload		Wilcoxon two-sample rank-sum test	
	$M (P_{25} \sim P_{75})$	Mean rank	Z	P
Male	3449 (2548~3966)	94.09	-2.158	0.031
Female	2945.5 (2193.75~4091.75)	77.74		
	Research workload		Z	P
	$M (P_{25} \sim P_{75})$	Mean rank		
Male	640 (0~1386)	99.83	-3.606	≤0.001
Female	50 (0~502.5)	73.16		

$P \leq 0.05$ significance level.

TABLE 5: Rank-sum test of teaching and research workload of teachers outstanding in research.

	Teaching workload		Wilcoxon two-sample rank-sum test	
	$M (P_{25} \sim P_{75})$	Mean rank	Z	P
Male	1476.5 (836.5~2208.25)	38.18	-0.109	0.913
Female	1330 (832~2262)	37.59		
	Research workload		Z	P
	$M (P_{25} \sim P_{75})$	Mean rank		
Male	3240 (1953.75~6623.75)	42.83	-2.884	0.004
Female	2259 (1404~2910)	27.09		

$P \leq 0.05$ significance level.

TABLE 6: Rank-sum test of teaching and research workload of teachers weak in both teaching and research.

	Teaching workload		Wilcoxon two-sample rank-sum test	
	$M (P_{25} \sim P_{75})$	Mean rank	Z	P
Male	1301 (692~1884.25)	210.44	-1.677	0.094
Female	1222 (655.5~1637)	190.78		
	Research workload		Z	P
	$M (P_{25} \sim P_{75})$	Mean rank		
Male	310 (0~902.5)	211.76	-1.966	0.049
Female	160 (0~680)	189.02		

$P \leq 0.05$ significance level.

TABLE 7: Correlation analysis of influencing factors of teachers' teaching and research behavior.

		Age	Professional title	Degree	Type of graduation university	Total teaching workload	Total research workload
<i>Male</i>	Correlation coefficient	0.308**	-0.271**	0.191**	0.007	1.000	-0.050
	Sig. (two-sided)	≤0.001	≤0.001	≤0.001	0.890		0.349
	N	357	357	357	357	357	357
Total teaching workload	Correlation coefficient	0.113*	-0.206*	0.061	0.092	0.475**	0.097
	Sig. (two-sided)	0.004	≤0.001	0.251	0.082	≤0.001	0.066
	N	357	357	357	357	357	357
The workload of guiding students	Correlation coefficient	0.151**	-0.245**	-0.059	-0.057	0.533**	0.193**
	Sig. (two-sided)	0.004	≤0.001	0.264	0.280	≤0.001	≤0.001
	N	357	357	357	357	357	357
Research on teaching reform	Correlation coefficient	-0.174**	-0.324**	-0.425**	-0.099	-0.050	1.000
	Sig. (two-sided)	0.001	≤0.001	≤0.001	0.061	0.349	
	N	357	357	357	357	357	357
Total research workload	Correlation coefficient						
	Sig. (two-sided)						
	N						

TABLE 7: Continued.

		Age	Professional title	Degree	Type of graduation university	Total teaching workload	Total research workload
Social services	Correlation coefficient	0.145**	-0.193**	-0.037	0.073	0.187*	0.270**
	Sig. (two-sided)	0.006	≤0.001	0.491	0.172	≤0.001	≤0.001
	N	357	357	357	357	357	357
Research project	Correlation coefficient	-0.180*	-0.210*	-0.360**	-0.117*	-0.015	0.757**
	Sig. (two-sided)	0.01	≤0.001	≤0.001	0.027	0.783	≤0.001
	N	357	357	357	357	357	357
Research papers	Correlation coefficient	-0.230**	-0.271**	-0.384**	-0.104*	-0.060	0.838**
	Sig. (two-sided)	≤0.001	≤0.001	≤0.001	0.049	0.260	≤0.001
	N	357	357	357	357	357	357
<i>Female</i>							
Total teaching workload	Correlation coefficient	0.332**	-0.333**	0.113	-0.093	1.000	-0.062
	Sig. (two-sided)	≤0.001	≤0.001	0.055	0.113		0.292
	N	290	290	290	290	290	290
The workload of guiding students	Correlation coefficient	0.221**	-0.241**	0.131*	-0.146*	0.474**	0.038
	Sig. (two-sided)	≤0.001	≤0.001	0.025	0.013	≤0.001	0.523
	N	290	290	290	290	290	290
Research on teaching reform	Correlation coefficient	0.065	-0.270**	0.100	-0.047	0.455**	0.145*
	Sig. (two-sided)	0.268	≤0.001	0.090	0.421	≤0.001	0.014
	N	290	290	290	290	290	290
Total scientific research workload	Correlation coefficient	-0.323**	-0.201**	-0.488**	-0.134*	-0.062	1.000
	Sig. (two-sided)	≤0.001	0.001	≤0.001	0.023	0.292	
	N	290	290	290	290	290	290
Social services	Correlation coefficient	0.126*	-0.197**	-0.06	0.017	-0.049	0.274**
	Sig. (two-sided)	0.031	0.001	0.913	0.778	0.403	≤0.001
	N	290	290	290	290	290	290
Research project	Correlation coefficient	-0.343**	-0.143*	-0.475**	-0.150*	-0.039	0.812**
	Sig. (two-sided)	≤0.001	0.015	≤0.001	0.011	0.504	≤0.001
	N	290	290	290	290	290	290
Research papers	Correlation coefficient	-0.331**	-0.159**	-0.346*	-0.128*	-0.41	0.766**
	Sig. (two-sided)	≤0.001	0.007	≤0.001	0.029	0.483	≤0.001
	N	290	290	290	290	290	290

Note: ** means that the correlation is significant when the confidence is 0.01; * is that the correlation is significant when the confidence is 0.05.

significant correlation. The teachers with a higher degree have less teaching workload. But female teachers are mainly reflected in the workload of guiding students. The type of female teachers' graduation university is significantly related to the output of research workload. The stronger the comprehensive strength of the graduation university is, the less the scientific research output is, while the male has no significant correlation.

5. Conclusion

From the total sample, there is no significant difference in teaching workload between male and female teachers, but there is a significant difference in research workload, and

male teachers are significantly more than female teachers. After being divided into three groups by cluster analysis, for teachers with outstanding teaching, the teaching and research workload of male teachers is significantly more than that of female teachers. For teachers with outstanding research, there is no significant difference in teaching workload between male and female teachers, but the research workload of men is significantly greater than that of women.

From the perspective of external evaluation, the maintenance of the university's position (discipline evaluation result, discipline development, and university ranking) among many competitors largely depends on the performance contributions of the above two groups of teachers. The allocation of government resources may also

be closely related to the university's teaching and research output. Through data comparison, it is found that female teachers in the above two groups are significantly inferior to male teachers in terms of output. Taking the objective conditions such as marriage and childbirth, family input needs, and physiology into account, it is unrealistic to rely solely on system design to achieve the same output of female teachers as male teachers. What university administrators can achieve is to design an effective system, which can make teachers have sufficient motivation to devote more energy to teaching and research.

The teachers who have not outstanding performance in teaching and research, obtained by cluster analysis in the article, are the key group to improving the overall vitality of the university. This part of teachers accounts for 61.33% of the total teachers. The analysis found some common factors affecting the teaching and research behavior of male and female teachers. For example, the promotion of professional titles has a significant negative correlation with the workload of teaching and research. The higher the degree, the better the performance of scientific research. The analysis also shows that the influence of individual external factors on male and female teachers is not exactly the same. For example, there is a significant positive correlation between male teachers' research work on teaching reform and age, while female teachers have no significant correlation. The higher the male teacher's degree, the less the teaching workload, while the higher the female teacher's degree, the more the workload of guiding students. The type of female teachers' graduation university is significantly related to the output of research workload. The stronger the overall strength of the graduation university, the less the research output, while the male has no such significant correlation.

Therefore, in the management of weak teachers, school management should pay due attention to the differentiated management of men and women, such as specialty, course, teaching material construction, guiding students to participate in competitions, and other teaching works out of classroom and scientific research works, which reflects the differences of assessment. In addition, it is necessary to strengthen the process management of teachers' teaching and research, which will help to provide a more scientific realization of differentiated system design. However, it is impossible for all these teachers to greatly improve their teaching and research capabilities, which is nearly unrealistic. But if some of them can improve their abilities, it will play a great role in the development of the university.

Finally, the data of this study is the three-year teaching and research workload of all teachers in Z University, which belongs to cross-sectional data, so the data analysis belongs to horizontal comparative analysis. Analyzing the dynamic changes of the professional title, age, and degree of individual teachers may reflect the influence of these factors more scientifically, which requires panel data. The author will further advance the existing research with the permission of new data in order to obtain more accurate results.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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