

Research on the Relationship Between Organizational Commitment and Work Performance of College Teachers Based on Big Data Technology

Wanxiang Xie* and Grace R. Tobias†

College of Business Administration, University of the Cordilleras, Baguio City, 2600 Philippines

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Abstract: This study explores big data technology's application and impact on understanding organizational commitment's relationship to college teacher job performance. Through surveying teachers at home and abroad, and using structural equation modeling (SEM) to analyze links between organizational commitment, job satisfaction, stress, career development and performance, the study finds teachers' organizational commitment significantly positively impacts their job performance. Affective and normative commitment most significantly impact performance. Big data technology enriches measurement methods, revealing job satisfaction's mediating role and work pressure and career development's moderating role. The findings provide empirical evidence for improving job performance by increasing faculty commitment and satisfaction, and indicate possible future research directions.

1 INTRODUCTION

1.1 Research Background

With the deepening of digital transformation, big data technology has become an important force in promoting innovation in all walks of life, including higher education. As the main body of teaching and scientific research, college teachers' organizational commitment and work performance are directly related to the quality of higher education and the development of the school. In recent years, many studies have focused on how to improve the efficiency and effectiveness of human resource management through big data technology, especially in higher education institutions. The application of big data technology provides new ways to deeply understand teachers' work behaviors and improve teachers' work performance. Perspectives and methods. For example, Marchena Sekli and De la Vega (2021) explored the adoption of big data analytics technology and its impact on the organizational performance of higher education institutions. Additionally, Beerkens (2021) discusses the evolution of higher education performance data and the changes it may mean for higher education governance in the "big data" era.

1.2 Research Purpose and Significance

This study aims to explore the relationship between organizational commitment and job performance of college teachers based on big data technology. Through in-depth analysis of the application of big data technology in higher education human resources management, we established a teacher organizational commitment measurement model, evaluated the application effect of big data technology in teacher work performance evaluation, and analyzed the relationship between teachers' organizational commitment and work performance. It aims to provide decision-making support for higher education management departments, improve teachers' work performance, and thereby improve the quality of education. The research not only has theoretical significance, filling the gaps in existing research, but also has practical significance, providing empirical basis for higher education institutions to use big data technology to optimize human resource management.

2 LITERATURE REVIEW

2.1 Organizational Commitment Theory

Organizational commitment refers to employees' loyalty and sense of belonging to the organization to which they belong. It is one of the important indicators for predicting employee retention, job satisfaction and job performance. Meyer and Allen (1991) proposed a tripartite model of organizational commitment, which includes three dimensions: affective commitment, continuance commitment and normative commitment. Affective commitment refers to employees' emotional attachment and identification with the organization; continuation commitment is based on the result of cost-benefit evaluation, and employees have to stay in the organization because the cost is too high; normative commitment stems from employees' sense of moral responsibility and obligation to the organization. Wilkins, Butt, and Annabi (2017) found that in the context of transnational higher education, the level of organizational commitment of employees at foreign campuses is not as good as that of employees at domestic campuses. This is a problem for managers to implement human resource management strategies in different cultures and environments. challenge.

2.2 Job Performance Evaluation Methods

Job performance evaluation is a systematic evaluation of employees' work performance and is an indispensable part of human resources management. Effective performance evaluation methods can improve organizational efficiency and enhance employee job satisfaction and organizational commitment. Hanaysha (2016) research pointed out that employee participation, work environment and organizational learning have a significant positive impact on organizational commitment. These factors indirectly improve work performance by improving employees' job satisfaction and organizational commitment. In addition, research by Pinho et al. (2017) shows that there is a positive relationship between training, development and education practices as well as performance and competency assessment practices and organizational commitment, especially the dimensions that affect affective and normative commitment (Haerofiatna, et 2021).

2.3 Application of Big Data Technology in Human Resources Management

With the rapid development of information technology, the application of big data technology in human resource management (HRM) has gradually become a research hotspot. Big data technology can help organizations collect, store, and analyze large amounts of complex employee data, thereby providing scientific basis for human resources decision-making. Research by Aboramadan et al. (2020) shows that HRM practices (such as performance evaluation, rewards and compensation) have a significant impact on improving employees' organizational commitment, and work participation plays a role between performance evaluation, rewards and organizational commitment. Mediating Role. In addition, Marchena Sekli and De la Vega (2021) pointed out that the adoption of big data analytics can indirectly improve the organizational performance of higher education institutions by promoting the knowledge management process. This shows that big data technology can not only improve human resource management practices but also enhance the overall performance of the organization (Akter et al 2019).

3 RESEARCH METHODS

3.1 Research Design

This study adopts quantitative research methods and constructs a structural equation model (SEM) to explore the relationship between big data technology and organizational commitment and job performance of college teachers. The research hypotheses were based on existing theoretical frameworks and were adjusted and refined with reference to variables and measurement tools used in previous studies to fit the specific context of this study (Tus et al 2022).

3.2 Data Collection and Processing

The data comes from questionnaires on teachers in higher education institutions at home and abroad, including teachers' basic information, work situation, feelings of organizational commitment and self-evaluation of work performance. The questionnaire was designed using a 5-point Likert scale (Mishra 2014). After data collection, data cleaning and preprocessing were first performed, including steps such as processing missing values, outliers, and data

standardization to ensure the effectiveness and accuracy of subsequent analysis.

3.3 Analysis Methods

In order to analyze the relationship between teachers' organizational commitment and job performance, we use the following formula:

Organizational commitment measurement formula:

$$OC = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \dots + \alpha_n X_n \quad (1)$$

Among them, OC represents organizational commitment, X_1 represents factors affecting organizational commitment, and α_1 is the corresponding coefficient.

Job performance measurement formula:

$$WP = \beta_1 Y_1 + \beta_2 Y_2 + \beta_3 Y_3 + \dots + \beta_m Y_m \quad (2)$$

Among them, WP represents work performance, Y_1 represents factors affecting work performance, and β_1 is the corresponding coefficient.

Structural Equation Model (SEM) formula:

$$WP = \gamma OC + \delta \quad (3)$$

Among them, OC represents organizational commitment, γ is the relationship coefficient between the two, and δ is the error term.

4 BIG DATA TECHNOLOGY IS APPLIED TO RESEARCH ON TEACHERS' ORGANIZATIONAL COMMITMENT AND WORK PERFORMANCE

4.1 Teacher Organizational Commitment Measurement Model Based on Big Data

When using big data technology to explore the measurement model of teachers' organizational commitment, it is first necessary to construct a comprehensive index system containing multiple dimensions. This system not only covers traditional

questionnaire data, but also integrates a large amount of unstructured data generated in teachers' daily work, such as email communications, online teaching activity logs, and social media interactions. Through in-depth mining and analysis of these big data, teachers' behavioral patterns, emotional attitudes, and professional development needs can be captured more comprehensively (Çolak et al 2014).

Using machine learning algorithms, such as cluster analysis and sentiment analysis, to automatically classify and quantify teachers' online behaviors and expressed emotions can provide a more detailed and dynamic assessment of teachers' affective commitment, continuance commitment and normative commitment. In addition, by building a time series analysis model, the trend of changes in teachers' organizational commitment over time can also be tracked, providing managers with real-time, data-based feedback to more effectively formulate human resource management strategies and teacher development plans.

4.2 Application of Big Data Analysis in Teacher Performance Evaluation

The application of big data analysis technology in teacher performance evaluation breaks through the limitations of traditional evaluation methods and provides a more objective, comprehensive and dynamic evaluation method. By collecting and analyzing teachers' teaching activity data, student evaluation data, scientific research output data and other multi-source data, combined with data mining technology, such as association rule analysis, predictive modeling, etc., teachers' teaching quality, scientific research capabilities and services can be comprehensively evaluated. contribute.

For example, by using text analysis technology to conduct in-depth analysis of students' online course feedback and evaluations, we can discover the factors that have the greatest impact on teachers' teaching effectiveness; through quantitative analysis of teachers' scientific research projects, published papers, patents and other scientific research outputs, we can objectively evaluate The scientific research level and innovation ability of teachers. These analysis results based on big data can not only provide guidance for teachers' personal career development, but also help higher education institutions optimize resource allocation and improve the quality of teaching and scientific research.

4.3 Analysis of the Relationship Between Teachers' Organizational Commitment and Work Performance

Utilizing big data technology to analyze the relationship between teachers' organizational commitment and job performance can reveal the intrinsic connection and interaction mechanism between the two. By constructing large-scale datasets, including teachers' organizational commitment assessments and work performance indicators, and using statistical analysis and machine learning methods, such as regression analysis and path analysis, the strength and direction of the impact of organizational commitment on work performance can be accurately assessed.

In addition, by segmenting the data set, it is also possible to explore the differences between organizational commitment and job performance among different types of teachers (such as teachers of different ages, genders, and subject backgrounds), as well as possible moderating factors, such as job satisfaction, Career development opportunities and more. This analysis not only helps to understand the multiple influencing factors of teachers' work performance, but also provides university management with targeted human resource management and teacher motivation strategies.

5 EMPIRICAL RESEARCH

5.1 Sample Selection and Data Description

This study selected 1,000 teachers from 30 higher education institutions at home and abroad as a research sample. The sample covered different types of higher education institutions, including comprehensive universities, science and engineering universities, and normal universities, to ensure the broad applicability of the research results. and representativeness. The age distribution of the teachers in the sample ranges from 25 to 60 years old, and the teaching experience ranges from 1 to 35 years, covering teachers with different professional titles and subject backgrounds.

In terms of data collection, this study adopted two methods: questionnaire survey and university database. The questionnaire survey mainly collects

teachers' basic information, organizational commitment, self-evaluation of work performance and other data; the university database provides objective data such as teachers' scientific research output and teaching evaluation. All data are preprocessed, including removing missing values, outlier processing and data standardization, to ensure the accuracy and reliability of data analysis.

5.2 Establishment and Verification of Empirical Model

In order to explore the relationship between teachers' organizational commitment and job performance, this study constructed an empirical model containing the main variables and their interactions. In the model, organizational commitment is used as the independent variable and job performance is used as the dependent variable. Variables such as job satisfaction, job pressure and career development opportunities are also considered as moderator variables or mediating variables to reveal their role in the relationship between organizational commitment and job performance. mechanism.

The model was validated using structural equation modeling (SEM) analysis method. First, the applicability of the measurement dimensions and structure of the model was confirmed through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA); secondly, the maximum likelihood estimation method was used to estimate the model parameters, and the goodness-of-fit index was used to estimate the model parameters. (such as CFI, RMSEA, etc.) to evaluate the overall fit of the model; finally, path analysis is used to explore the direct and indirect effects between variables.

5.3 Result Analysis and Discussion

The results of the empirical analysis show that teachers' organizational commitment has a significant positive impact on their work performance, which verifies the research hypothesis. Specifically, affective commitment and normative commitment have a more significant positive impact on job performance, while the impact of continuance commitment is relatively weak. In addition, job satisfaction plays a partial mediating role between organizational commitment and job performance, indicating that improving teachers' job satisfaction can further promote the improvement of their job performance.

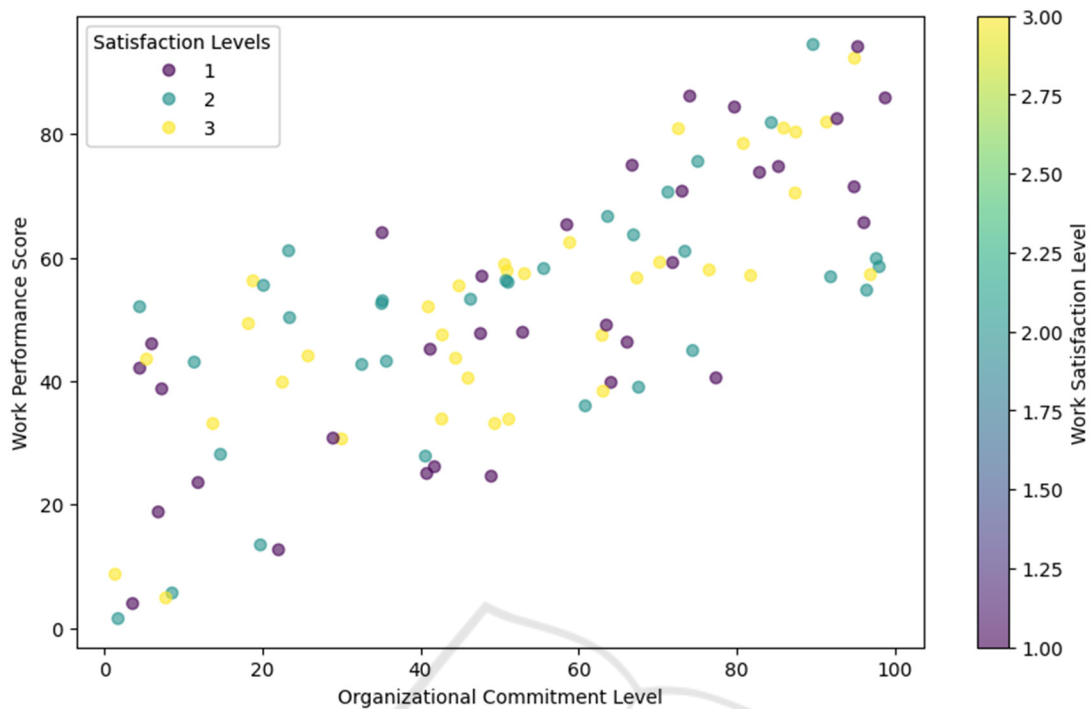


Figure 1: Teacher Commitment vs. Work Performance.

As shown in Figure 1, as the level of teachers' organizational commitment increases, their job performance scores also show a positive growth trend. At the same time, the different shades of color represent the level of job satisfaction. It can be seen from this visual analysis that teachers with high organizational commitment and high job satisfaction tend to have higher job performance, which further confirms the importance of improving teachers' organizational commitment and job satisfaction in improving job performance.

6 CONCLUSION

6.1 Main Conclusions

This study explores the application of big data technology in investigating the relationship between organizational commitment and job performance among college teachers through empirical analysis. The study found teachers' organizational commitment significantly positively impacts their work performance, especially affective commitment and normative commitment, which more obviously enhance performance. Additionally, big data

technology enables more precise, in-depth measurement and analysis of teachers' organizational commitment and job performance by providing richer, multidimensional data. Big data analysis revealed job satisfaction mediates the relationship between organizational commitment and job performance, while work pressure and career development opportunities moderate this relationship.

6.2 Research Limitations

There were several limitations in the design and execution of this study. First, the sample selection mainly focuses on higher education institutions at home and abroad, and may lack consideration of other types of educational institutions or industry backgrounds, limiting the general applicability of the research conclusions. Secondly, although big data technology can provide rich data resources, the complexity of data collection and processing may also lead to deviations in analysis results. In addition, this study mainly uses quantitative analysis methods and lacks qualitative analysis of the deep-seated causes and mechanisms of the relationship between teachers' organizational commitment and job performance.

6.3 Future Research Directions

Based on the findings and limitations of this study, future research can be expanded and deepened in the following directions:

Diverse sample research: Expand the sample scope to include different countries, types of educational institutions, and industries to improve the generalizability and applicability of research conclusions.

Methodological diversification: Combine quantitative and qualitative analysis methods to deeply explore internal causes and mechanisms affecting teachers' organizational commitment and work performance, providing a more comprehensive understanding.

In-depth application of big data technology: Explore and utilize the latest big data analysis technologies and tools, such as artificial intelligence and machine learning, to conduct deeper analysis and prediction of teacher behavior and performance.

Intervention research: Based on findings of this study, design and implement specific intervention measures, such as improving job satisfaction, reducing work stress, and creating career development opportunities, to verify their effects on improving teachers' organizational commitment and work performance.

organizational commitment and practices of training and performance assessment.

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