

Innovative Practices in Human Resource Management for University Teachers' Research Assessment in the Context of Digital Transformation

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ABSTRACT

Against the backdrop of digital transformation driving changes in university research models, traditional human resource management approaches for university teachers' research assessment can hardly meet the demands arising from the growth of research data, the diversification of achievement forms, and the innovation of collaboration models. From a professional and technical perspective, this paper analyzes the importance of human resource management innovation in this scenario, examines specific challenges such as fragmented research data, difficulties in quantifying digital achievements, and lagging data updates, and further proposes practical strategies including the construction of a research data middle platform, the establishment of a hierarchical standard for digital achievements, and the development of a real-time data module. The research shows that through the technological innovation of human resource management, the accuracy and dynamics of research assessment can be improved, providing support for the optimal allocation of university research human resources.

KEYWORDS

Digital transformation; University teachers' research assessment; Human resource management innovation; Research data middle platform; Contribution algorithm

1 Introduction

Currently, digital technologies are deeply penetrating all processes of university research activities. Research data is expanding from the traditional text-based type to multimodal forms, and research collaboration is shifting from offline single-team models to cross-regional and interdisciplinary networked models. This transformation has led to significant changes in the evaluation dimensions and value judgment standards of university teachers' research capabilities. However, the human resource management of traditional research assessment still relies on manual data collection, fixed-cycle evaluation, and single-achievement-oriented methods, making it difficult to achieve dynamic tracking of teachers' research behaviors and identification of diverse values ^[1]. From the perspective of human resource management, research assessment is not only an evaluation of teachers' past achievements but also a key link in guiding teachers' career development and optimizing the allocation of research human resources. In the context of digital transformation, continuing to use traditional management logic may lead to a disconnect between assessment results and teachers' actual research contributions, thereby affecting the enthusiasm of research teams and the efficiency of research resource allocation. Therefore, exploring the innovation of human resource management for research assessment requires relying on digital technologies to reconstruct the data sources, evaluation dimensions, and management processes of assessment. This will enable the assessment system to not only match the new characteristics of digital research but also give full play to the supporting and guiding role of human resource management in research activities.

2 The importance of human resource management innovation for university teachers' research assessment in the context of digital transformation

2.1 Enhancing the accuracy of research achievement value evaluation

Before digital transformation, university teachers' research assessment mostly focused on quantitative indicators such as the number of published papers and the level of research projects, which could hardly fully cover implicit dimensions of research achievements, such as application value, transformation potential, and academic influence ^[2]. Through the digital innovation of human resource management, multi-source data in the process of teachers' research can be integrated, including real-time changes in paper citation frequencies, industry application feedback on project achievements, and the number of experimental data sharings. With the help of data modeling, a multi-dimensional evaluation of the value of research achievements can be realized. For example, for teachers in science and engineering disciplines, the achievements of digital transformation of experimental equipment they lead can be quantified not only

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through data on the improvement of experimental efficiency after transformation but also the sharing value can be evaluated based on the reuse of the equipment by other teams. This multi-source data-based evaluation method can more accurately reflect the actual value of research achievements and avoid value misjudgment caused by the "quantity-only theory" in traditional assessment.

2.2 Adapting to the personalized needs of teachers' career development

The research directions of university teachers show significant differences due to disciplinary variations. For instance, teachers in liberal arts focus on theoretical research and policy analysis, while teachers in engineering focus on technological research and development as well as achievement transformation. The traditional unified assessment standards can hardly meet the career development needs of different types of teachers. The innovation of human resource management can rely on digital tools to build personalized assessment plans. By analyzing teachers' past research trajectories, skill strengths, and development goals, differentiated assessment indicators and cycles can be set for them. For example, for young teachers in the early stage of their careers who focus on interdisciplinary research, a digital system can be used to track their collaborative contributions in interdisciplinary teams and phased research progress, rather than taking only the final achievements as the assessment basis. For teachers approaching retirement who focus on the inheritance of research experience, data on their guidance to young teachers and the sharing of research resources can be included in the assessment dimensions. This personalized assessment design can better align with teachers' career development stages and disciplinary characteristics, stimulating the research enthusiasm of different types of teachers^[3].

2.3 Optimizing the dynamics of research human resource allocation

The allocation efficiency of university research resources directly affects the quality of research activities. However, the traditional allocation of research human resources mostly relies on historical assessment results for static adjustments, which can hardly adapt to the dynamic change needs of digital research. Through the innovation of human resource management, a dynamic matching mechanism between research human resources and research projects can be established. With the help of a digital platform, the personnel structure, skill gaps, and project progress of each research team can be monitored in real-time, thereby realizing the accurate allocation of human resources. For example, when a national-level research project enters the technical breakthrough stage and requires the participation of teachers with specific digital modeling capabilities, the digital assessment management system can quickly screen out teachers who possess such skills and have a relatively low current research load to supplement the project team with appropriate human resources. At the same time, by tracking the contribution data of teachers in the project, references can be provided for the human resource allocation of similar projects in the future, avoiding problems such as resource idleness or insufficient allocation.

3 Challenges faced by human resource management innovation for university teachers' research assessment in the context of digital transformation

3.1 Fragmented research data leading to assessment dimension gaps

Currently, the research data of university teachers is scattered and stored on different platforms. For example, academic paper data is stored in academic databases such as CNKI and Wanfang, research project data is stored in the university's research management system, experimental data is stored in local servers of various laboratories, and interdisciplinary collaboration data may be scattered on collaboration platforms of different institutions. Due to inconsistent formats and incompatible interfaces, these data can hardly be effectively integrated, resulting in the inability to form a complete portrait of teachers' research behaviors during research assessment. For instance, a teacher in the computer major of a university participates in algorithm research and development in the school's laboratory, software testing projects in cooperation with enterprises, and interdisciplinary artificial intelligence theoretical research with other institutions. The experimental data of the algorithm research and development is only stored on the laboratory server, the achievement feedback of the software testing is stored in the enterprise system, and the paper data of the theoretical research is stored in academic databases. If the assessment only relies on the project data in the university's research management system, the teacher's contributions in experimental research and development as well as enterprise cooperation will be omitted, leading to incomplete assessment dimensions and failure to fully reflect the teacher's research capabilities and actual efforts.

3.2 Lack of unified standards for quantifying the value of digital research achievements

Digital transformation has given rise to new forms of research achievements such as virtual simulation experiments, online collaborative papers, and research data sharing platforms. These achievements differ significantly from traditional papers and monographs in terms of value presentation, and there is currently no unified quantitative standard for their use in research assessment. For example, a virtual simulation anatomy experiment platform developed by a teacher in the medical major of a university can replace traditional physical anatomy experiments, reducing teaching costs and improving the safety of students' operations. However, there is no clear basis for quantifying the value of this platform. If only the number of uses of the platform is taken as the assessment indicator, it cannot reflect the technical difficulty and innovation level in the platform development process; if the evaluation standard for project achievements is referenced, it can hardly match the characteristics of this platform as an achievement combining teaching and research. The lack of such quantitative standards makes it difficult for some teachers' digital research achievements to be included in the assessment system or leads to their underestimation in the assessment, affecting teachers' enthusiasm for conducting digital research innovation.

3.3 Lagging updates of real-time assessment data affecting dynamic evaluation

Traditional research assessment mostly adopts a fixed-cycle evaluation model on an annual or semi-annual basis. Even if some universities have introduced digital assessment systems, data updates still rely on manual uploads or regular synchronization, resulting in assessment data failing to reflect teachers' latest research progress in real-time. For example, a teacher in the chemistry major of a university achieves an important experimental breakthrough in the middle of a quarter, and the formed experimental data can support the subsequent publication of high-level papers. However, due to the fact that the data update cycle of the university's research management system is at the end of each quarter and requires teachers to manually upload experimental achievements, this progress of the teacher cannot be included in the dynamic assessment in a timely manner. This not only affects the accurate judgment of the teacher's phased research performance but also makes it impossible for the university to adjust support strategies based on the latest progress when allocating research resources, which may lead to a disconnect between resource allocation and teachers' research needs and delay the progress of research projects.

4 Practical strategies for human resource management innovation for university teachers' research assessment in the context of digital transformation

4.1 Constructing a university research data middle platform to realize multi-source data integration

To address the problem of fragmented research data, universities can build a unified research data middle platform. By connecting different data sources such as academic databases, research management systems, laboratory servers, and enterprise collaboration platforms through standardized data interfaces, centralized storage and unified formatting of research data can be achieved. In terms of technical implementation, ETL (Extract-Transform-Load) tools can be used to clean and integrate scattered data, and a unified data model covering dimensions such as teachers' basic information, research project progress, achievement output, and collaboration records can be established. At the same time, a data access permission management module can be set up to ensure that different entities can only access data within their permission scope, thus ensuring data security. This measure can break down the platform barriers of research data, provide complete data support for teachers' research behaviors for assessment, avoid assessment dimension gaps caused by fragmented data, and make assessment results more comprehensively reflect teachers' research contributions.

4.2 Establishing a hierarchical evaluation standard for the value of digital research achievements

To solve the problem of difficulty in quantifying digital research achievements, universities should join hands with discipline experts, representatives from industry and enterprises, and digital technology personnel to jointly formulate a hierarchical evaluation standard for the value of digital research achievements. Firstly, primary categories are divided according to the types of digital achievements; secondly, core evaluation indicators are set for each type of achievement. For example, for virtual simulation experiments, secondary indicators can be set from dimensions such as technical innovation level, application scope, and teaching and research support effects; finally, quantitative scores and hierarchical standards are set for each secondary indicator. In assessment practice, a digital system can be used to automatically match the digital achievements submitted by teachers with the hierarchical standards, generate preliminary evaluation results, and then discipline experts conduct review and adjustment to ensure the objectivity and accuracy of the value evaluation of digital achievements, enabling such achievements to be reasonably included in the research assessment

system.

4.3 Building a real-time data collection and analysis module to ensure dynamic evaluation

To solve the problem of lagging updates of assessment data, universities can build a real-time data collection and analysis module based on the research data middle platform to realize automatic synchronization and dynamic monitoring of research data. Specifically, real-time connections can be established with various research platforms through API interfaces. For example, connections can be made with academic databases to obtain data on the publication and citation of teachers' latest papers, with laboratory equipment systems to obtain experimental progress and data output, and with project management platforms to obtain information on the completion of teachers' collaborative tasks. At the same time, a real-time data analysis algorithm can be developed to process the collected dynamic data in real-time and generate visual reports on teachers' research progress and phased assessment suggestions. For example, when the system detects a significant short-term increase in the citation frequency of a teacher's paper, it can automatically prompt the assessment administrator to pay attention to the changes in the teacher's academic influence and take it as the basis for dynamic assessment adjustment. For teachers in the critical stage of research, the system can regularly send research progress reminders and resource demand surveys to provide support for the dynamic adjustment of assessment and resource allocation, ensuring that the assessment can timely reflect teachers' latest research status.

5 Conclusion

In the context of digital transformation driving profound changes in university research models, the innovation of human resource management for university teachers' research assessment has become a key link in optimizing the allocation of research human resources and stimulating teachers' research vitality. However, during the innovation process, there are still specific challenges such as fragmented research data, lack of quantitative standards for digital achievements, and lagging data updates. Essentially, these problems are manifestations of the mismatch between traditional human resource management logic and the characteristics of digital research. By implementing practical strategies such as constructing a research data middle platform, establishing a hierarchical standard for digital achievements, building a real-time data module, and developing an interdisciplinary contribution algorithm model, the above challenges can be effectively addressed. This enables the transformation of human resource management for research assessment from "static evaluation" to "dynamic tracking" and from "single quantification" to "diversified value". In the future, universities need to continuously pay attention to the development trends of digital technologies and constantly optimize innovation strategies, so that the human resource management for research assessment can always keep pace with the changes in research models and provide solid human resource support for the improvement of university research competitiveness.

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