

Data Intelligence Empowering Path for Evaluation of Teachers' Ideological and Political Work in Higher Education

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Abstract: Monitoring and evaluating teachers' ideological and political work in Chinese universities is critical, but there are practical challenges in evaluating it scientifically and efficiently. Big data and artificial intelligence technologies provide new ideas and methodologies to address these challenges. This study proposes a technical path empowered by data intelligence for evaluating university teachers' ideological and political work. It conducted comprehensive profiling and assessment based on data by establishing an evaluation framework through Large Language Model (LLM) technology, data analysis, and visualization methods. This study provides references for the implementation path and methodological strategies to enable quality monitoring and evaluation of university teachers' ideological and political work in the era of digital intelligence.

Keywords: Ideological and political work of university teachers; Evaluation framework; Data intelligence; Artificial intelligence, Large language model

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1. Introduction

Teachers' ideological and political work in Chinese universities is important in creating a professional teaching force with high ideological and political quality and teacher ethics, helping universities implement the fundamental task of fostering virtue through education and promoting high-quality development. Scientific and efficient evaluation of university teachers' ideological and political work is crucial for researchers to investigate the relevant work of universities and for practitioners to monitor and supervise universities to improve their work quality.

With the development of the times, big data and artificial intelligence technology have been increasingly applied in higher education, providing new ideas and methodologies for monitoring and evaluating university teachers' ideological and political work and its quality. Data and intelligent technology can provide a scientific

evaluation system, effective evaluation results, and powerful decision-making support, which helps improve the quality and effectiveness of university teachers' ideological and political work.

Under the background of digital transformation in education, how to monitor, analyze, and evaluate university teachers' ideological and political work through data intelligence empowering to guide and promote the development of this work has become a cutting-edge topic for relevant research and practice. Based on the requirements of ideological and political work for university teachers, this study proposes a data intelligence empowering technical path for evaluating university teachers' ideological and political work. It establishes an evaluation framework through Large Language Model (LLM) technology, data analysis, and visualization methods. It conducts comprehensive profiling and assessment based on data, which helps to improve the scientific nature of evaluation standards, the comprehensiveness of evaluation content, and the advancement of evaluation means. The study aims to provide an implementation path and methodological strategy reference for data intelligence empowering quality monitoring and evaluation of university teachers' ideological and political work and to promote the high-quality development of this work in the era of digital intelligence.

2. Challenges and opportunities in applying data intelligence for ideological and political work in universities

In the literature, the study found that some researchers have explored the role and value of data intelligence in ideological and political work in universities. Some researchers have explored the technical application of big data and artificial intelligence in ideological and political work in universities. The introduction of big data and artificial intelligence technologies enables the evaluation process to be analyzed and processed using massive amounts of data, thereby improving its accuracy and effectiveness^[1]. Big data can promote the innovation of ideological and political work methods in universities. Analyzing full data can help improve the work's objectivity, comprehensiveness, human orientation, and foresight, providing a basis for innovation^[2]. It is crucial to improve the big data literacy of ideological and political and build a working system for big data applications^[3]. Data intelligence technologies make it possible to analyze massive amounts of data to improve the accuracy and effectiveness of the evaluation^[4]. Researchers have proposed the concept of precise ideological and political education based on data, emphasizing the importance of precise identification, analysis, decision-making, prediction, and tracking of groups and individuals^[5].

Although the role of data intelligence in ideological and political work in universities is widely recognized, its practical application still needs to be improved. In the process of digital technology empowering ideological and political work in universities, problems such as digital levitation, technological rational disorder, and digital traps have emerged^[6]. Challenges include conceptual reorganization, mechanism reconstruction, capacity reshaping, and indicator reformulation in integrating ideological and political work with information technology^[7]. The lack of data processing and analysis capacity in universities has led to the failure of big data technology to reach its full potential^[8]. These issues hinder the practical application of data in ideological and political work in universities.

Some researchers have proposed the construction architecture of digital-related platforms, including user, display, access, service, data, and hardware layers^[9]. Others have tried to build digital ideological and political work systems by combining digital twins, artificial intelligence, and other technologies^[10]. However, such research primarily focuses on constructing relevant application systems and seldom involves applying data

analysis and AI for ideological and political evaluation work.

Some researchers have proposed that artificial intelligence provides new methods and tools for evaluating university ideological and political education ^[11]. Dynamic monitoring and feedback warning of ideological and political work can be realized through intelligent perception, intelligent calculation, and intelligent interaction technologies ^[12]. With the rapid development of LLM, some researchers began to pay attention to their application in ideological and political work. Researchers proposed that big language models can change the traditional mode of ideological and political education through their powerful natural language processing abilities, thus improving the efficiency and effectiveness of ideological and political education ^[13,14]. However, due to the insufficient domain-specificity of general-purpose LLM, their application in ideological and political education faces professional barriers, and they need to be deeply integrated with the domain to achieve more accurate application ^[15].

In summary, data intelligence empowering ideological and political work in universities has received attention in the field and is in a stage of rapid development. However, many practical difficulties and gaps need to be filled. Current researchers have generally agreed on the important role and value of data intelligence and have tried to put forward various ideas and thoughts. Few researchers have conducted practical research on data intelligence technology enabling ideological and political evaluation of university teachers. More specific practical application paths, methods, and innovative application cases must be developed. There are a series of technical challenges at the practical level, such as the construction of evaluation systems, data processing, analysis, and visualization applications. More adequate technical solutions are needed.

3. Methodological approaches for implementing data intelligence in evaluating university teachers' ideological and political work

This study addresses the key issues of monitoring and evaluating teachers' ideological and political work in universities empowered by data intelligence. It focuses on the practical needs of data intelligence to support the ideological and political work of university teachers. It explored in-depth data intelligence-enabled ideological and political evaluation of teachers regarding evaluation system construction, intelligent text evaluation, analysis system design, and application prototype development.

This study completed the evaluation indicators system and system design and construction process by comprehensively applying design research methods, LLM intelligence construction, and data visualization analysis. Firstly, this study proposed the technical path of data intelligence empowering evaluation of teachers' ideological and political work in universities through the design research method and iteratively improved. Then, the evaluation-related agents were designed based on LLM technology to achieve the design of the evaluation indicators system for teachers' ideological and political work, intelligent text evaluation, and online data insights. Finally, the study develops the prototype system of data analysis and visualization.

3.1. Design and optimization of data intelligence solutions

Based on policy documents and field practice, this study completed the design and iteration of a data intelligence technology solution through design research. The study established the systematic process of data intelligence-supported ideological and political evaluation and completed the overall design of the data technology architecture. Several rounds of iterations were carried out to continuously optimize and improve the design, which ensures the validity and feasibility of data intelligence-supported evaluation of ideological

and political work and provides a data intelligence solution for the ideological and political evaluation of university teachers.

3.2. Integrated design of LLM agents with prompts, knowledge bases, and workflows

In ideological and political evaluation, the practical application of LLM agents must be realized through the integrated design of prompts, knowledge bases, and workflows.

Firstly, prompts can set roles and basic logic for the agents, guiding them to better understand the background and specific needs of ideological and political work evaluation. By endowing the knowledge base with domain knowledge related to the evaluation of ideological and political work, the agents can make more accurate and comprehensive judgments.

Workflow design is the key to implementing LLM effectively in ideological and political evaluation. It can provide agents with rigorous work logic and powerful processing functions, helping them complete relevant tasks in ideological and political evaluation in an orderly manner according to established steps and processes.

3.3. Data analysis and visualization techniques for quantitative evaluation

This study adopted data analysis and visualization techniques to efficiently achieve quantitative evaluation to extract valuable information and patterns from large amounts of data to achieve dynamic monitoring and comprehensive evaluation. Specific analysis methods and techniques are shown as follows:

- (1) Descriptive analysis: Shows the comprehensive status and statistical characteristics of data in teachers' ideological and political work.
- (2) Exploratory analysis: Reveals implicit connections with exploratory data mining and provides a basis for evaluation and suggestions for improvement.
- (3) Interactive visualization: Provides interactive visualization to facilitate data analysis for multiple scenarios, enabling in-depth and comprehensive understanding.
- (4) Artificial intelligence technology integration: Embeds LLM-based data intelligence to assist users with data insights.

4. Construction phases of a data intelligence-empowered evaluation system for teachers' ideological and political work

At the evaluation system construction stage, this study provides a feasible solution for the intelligent construction of the evaluation indicators system of teachers' ideological and political work by LLM agents integrating prompts, knowledge bases, and workflows. At the system design stage, a data-based analysis and evaluation system was designed. At the application research and development stage, the designed data evaluation system was prototyped and implemented, and the technical path of data storage, analysis, and display application was opened up to achieve data-based evaluation support.

4.1. Path design for digital intelligence technology enablement

- (1) The study developed LLM agents to support constructing a comprehensive and scientific evaluation indicators system.
- (2) The study analyzed data corresponding to each indicator system, including system data, fill-in data, and unstructured text-based data. For the unstructured text-based data, corresponding agents were developed

for the analysis.

- (3) A data system was designed and implemented to support data analysis, visual presentation, and online interaction, and it was embedded with data intelligence.

4.2. Evaluation system construction based on agents

This study developed agents for constructing the evaluation indicators system of ideological and political work in universities based on LLM. The persona and reply logic of the agents were determined by given prompts, defining the role as an expert in the evaluation of ideological and political work in universities and further designing the skills and restrictions of the role. A knowledge base is built through policy documents and best practice documents, storing relevant domain knowledge of ideological and political work evaluation. The process of evaluation criteria construction is decomposed through workflow, achieved through various steps such as problem understanding, knowledge base query, evaluation criteria generation, and iterative optimization and improvement. AI agents can provide important references and support for researchers or managers in constructing evaluation indicator systems for ideological and political work in universities, enhancing the scientific nature and efficiency of the indicator system design.

4.3. The evaluation technique of unstructured text-based data based on agents

Currently, the amount of structured data related to teachers' ideological and political work in universities still needs to be increased. A large number of datasets in teachers' ideological and political work are mainly unstructured textual data such as, reports, and briefings, for which intelligent analysis and evaluation are critical. In this context, constructing relevant AI agents to generate evaluation standards has become a key step to improving the quality and efficiency of evaluating teachers' ideological and political work in universities. The intelligent analysis supported by LLM can help us extract important information from unstructured data to quantitative data, enabling a more comprehensive and precise foundation for decision-making in the evaluation of ideological and political work. The quantitative data generated from unstructured data builds a solid ground for further data analysis and visualization.

4.4. Overall design of the data analysis system

In this study, the data analysis system was designed as a three-layer architecture, including the data layer, analysis layer, and presentation layer. In the data layer, the data structure and data warehouse were designed. Various analysis techniques were implemented in the analysis layer to complete the required data calculation for evaluation. In the presentation layer, visual analysis of the data was achieved through various visualization methods. The underlying database of this data analysis system adopted the Oracle database, while Tableau software was used to realize the analysis and presentation.

4.5. Development of prototype systems

In the development stage of the prototype system, data related to the ideological and political evaluation of university teachers was simulated according to the preliminary design to verify the feasibility of the system design. The data was integrated, aggregated, cleaned, and converted to construct a simulated data warehouse.

In this study, a prototype system of ideological and political evaluation data analysis for university teachers was technically implemented, including applications such as overall evaluation of the ideological and political

work of evaluated teachers, classified evaluation of the ideological and political work of various types of universities, and comparative analysis of the ideological and political work of multiple universities. The system interface has interactive functions such as condition filtering, parameter setting, data drilling down, chart linkage, etc. Meanwhile, LLM-based agents were embedded in key applications for data insight. Based on the general capabilities of the LLM, role and skill settings were completed through prompts, teachers' ideological and political domain knowledge was provided through a knowledge base, a step-by-step analysis process was realized through workflow, and collaborative strategy among multiple LLM nodes greatly improved analysis effect, which enabled researchers or practitioners to assist in carrying out self-service data observation and in-depth analysis online.

5. Reflections on enhancing university teachers' ideological and political work evaluation through AI and data technology

The evaluation of the ideological and political work of university teachers is a complex practical problem that requires demonstrating the status of this work from various levels and dimensions while ensuring the results are easily understandable. The key to improving evaluation outcomes is conducting in-depth assessments using artificial intelligence and data technology.

This study focuses on the practical exploration of critical steps such as evaluation system construction based on LLM, unstructured data evaluation technology, design of evaluation data analysis systems, and development of evaluation prototype systems. The proposed technical path provides systematic, multi-dimensional results by deeply applying LLM to the ideological and political evaluation of university teachers and implementing data analysis prototype systems using data analysis and visualization methods. Interactive data display and LLM technology enhance the application value of the evaluation outcomes by enabling in-depth data analysis and interpretation.

6. Conclusion

This study designs an evaluation path based on LLM and data technology to address the evaluation of university teachers' ideological and political work. It provides a solution for empowering the assessment of teachers' ideological and political work in universities through artificial intelligence and big data, which has wide practical application value for similar evaluation tasks.

The study demonstrates how data intelligence can enable more scientific, comprehensive, and advanced evaluation of university teachers' ideological and political work. Establishing an evaluation framework through LLM technology, data analysis, and visualization methods supports comprehensive profiling and assessment based on data. This research provides an implementation path and methodological strategy reference for data-driven quality monitoring and evaluation in this domain, promoting the high-quality development of teachers' ideological and political work in the era of digital intelligence.

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Disclosure statement

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