

The Big Data Application of Law Case Library Research on the Path of Administrative Law Teaching and Practical Assistance

Fuyin Zhou

Henan Judicial Police Vocational College, Zhengzhou 450046, Henan, China

Corresponding author: Fuyin Zhou (e-mail: wsjs20010101@sina.com)

ABSTRACT Amid the dual imperatives of digital rule of law and educational transformation, administrative law teaching faces structural challenges such as fragmented case resources, inaccurate retrieval, and a persistent disconnect between theory and practice. These challenges become more pronounced when legal education must address complex engineering-related regulatory scenarios, including data governance, industrial compliance, communication infrastructure, and specialized technical disputes. Big data technology, with its advantages in massive data integration, correlation mining, intelligent analysis, and prediction, provides technical support for upgrading legal case libraries and integrating administrative law teaching with practice. This study proposes a big-data-enabled administrative law case library and examines its application path in teaching and practical assistance. The case library integrates multi-source judicial, administrative, and teaching resources, supports precise retrieval and correlation analysis, and provides intelligent functions such as similar-case recommendation, judgment-logic visualization, and risk warning. By linking case resources with teaching tasks and practical legal workflows, the system helps solve the problems of outdated cases, shallow analysis, and insufficient skill training in traditional teaching. The study indicates that a big data legal case library can improve resource utilization, strengthen legal application ability, and support the coordinated development of administrative law education and practice.

INDEX TERMS legal case library, big data analytics, administrative law, engineering regulation, teaching empowerment

I. INTRODUCTION

A. RESEARCH BACKGROUND

As a core discipline that regulates the exercise of administrative power and safeguards the legitimate rights and interests of citizens, the teaching quality and practical level of administrative law are directly related to the construction of a rule of law government and the development of digital rule of law [1-2]. The Implementation Outline for the Construction of a Rule of Law Government (2021-2025) clearly proposes to promote the digitization of rule of law education, build an intelligent case library for legal studies, and enhance the quality of legal talent training and the effectiveness of law enforcement and judiciary. While the development of administrative law case libraries in China has achieved measurable progress, the integration of specialized parameters remains a prominent challenge for consistent legal application. Ensuring that judicial databases accurately reflect the high-precision technicalities of the industry is essential for resolving administrative disputes

and fostering industrial modernization [3].

B. RESEARCH SIGNIFICANCE

1) Theoretical Significance

(1) Constructing a theoretical framework for the big data application of a legal case library, clarifying the integration mechanism of big data technology with administrative law teaching and practice, and enriching the theoretical system of digital rule of law and legal education;

(2) Propose the architecture design and core functions of the big data legal case library, improve the theory of upgrading and iterating the legal case library, and expand the application boundaries of big data in the field of law;

(3) Revealing the empowering mechanism of big data case library in administrative law teaching and practice, establishing a theoretical model for the coordinated development of “teaching practice case library”, and providing theoretical support for the integration of legal education and practice.

2) Practical Significance

(1) Develop a big data case library that is suitable for the teaching and practical needs of administrative law, achieve accurate retrieval, in-depth analysis, and intelligent application of case resources, and improve resource utilization efficiency;

(2) The empowerment path of building a big data case library in administrative law teaching, solving problems such as outdated cases, shallow analysis, and insufficient skill training in traditional teaching, and improving the quality of legal talent cultivation;

(3) Establishing a big data case library as an auxiliary path in administrative and judicial practice, improving case processing efficiency, legal application accuracy, and judicial fairness, and assisting in the construction of a rule of law government;

(4) Establish a collaborative optimization mechanism of "teaching practice case library", promote precise alignment between teaching content and practical needs, and provide replicable practical experience for the big data application of case libraries in other departments [4].

C. CURRENT RESEARCH STATUS AT HOME AND ABROAD

1) Current Research Status Abroad

Foreign countries started early in the field of big data application in legal case libraries, mainly focusing on three directions:

Teaching application research, deeply integrating big data case library with teaching models such as case teaching method and simulated court, to cultivate students' legal practice ability; Practical assistance research, utilizing big data analysis technology to achieve functions such as case similarity matching, judgment result prediction, legal risk assessment, etc., to assist judicial judgments and administrative decision-making [5].

2) Current Research Status in China

In recent years, domestic research has developed rapidly and conducted extensive explorations around legal case libraries and big data applications

(1) In terms of case library construction, public legal databases such as China Judgments Online and Law Information Network have been established, as well as internal case libraries of various universities. However, the level of big data is relatively low and the intelligent application functions are insufficient;

(2) In terms of teaching application, some universities have attempted to use case libraries for administrative law teaching, but most of them are simple case displays and searches, lacking deep empowerment;

(3) In terms of practical assistance, judicial and administrative agencies have begun to explore the application of big data case libraries, but the scope of application is relatively narrow, mainly focusing on case retrieval and statistical analysis;

(4) In terms of technological integration, scholars have attempted to use big data and artificial intelligence technologies for case analysis, but the integration with administrative law teaching and practice is not deep enough.

D. RESEARCH IDEAS, METHODS, AND INNOVATIVE POINTS

1) Research Approach

This article follows the technical route of "theoretical sorting - current situation diagnosis - case library construction - path design - empirical verification - optimization and improvement":

1. Systematically review the research achievements in the fields of administrative law case library, big data technology application, and integration of legal education and practice, and clarify the research foundation and improvement direction;

2. Diagnose the current status and core issues of the integration of the application, teaching, and practice of the administrative law case library through methods such as questionnaire surveys, in-depth interviews, and field research;

3. Design the architecture and functionality of a big data legal case library, integrate multiple sources of administrative law case data, and develop core technology modules;

4. Construct application paths for big data case libraries in the teaching and practice of administrative law;

5. Select universities and practical institutions to conduct empirical research and verify the effectiveness of application;

6. Based on empirical results, optimize the functionality and application path of the case library, and form a scalable practical paradigm [6-7].

2) Research Methods

(1) Literature research method: Systematically sorting out research achievements in the fields of administrative law, legal case library, big data technology, legal education, etc., laying a theoretical and technical foundation;

(2) Current situation research method: Conduct a questionnaire survey and in-depth interviews with 400 teachers and students from 8 universities and 200 staff members from 15 judicial and administrative practice institutions to diagnose core issues;

(3) System design method: adopting modular design ideas, constructing the architecture of a big data legal case library, and developing core functional modules;

(4) Path construction method: Combining the teaching rules and practical workflow of administrative law, design a dual application path for the case library;

(5) Empirical research method: Set up an experimental group and a control group, conduct an 18 month empirical study, and verify the application effectiveness through quantitative data and qualitative evaluation;

(6) Statistical analysis method: Descriptive statistics, difference analysis, and correlation analysis were conducted

on empirical data using SPSS 26.0 and Python 3.9 to quantitatively evaluate the application effect [8].

II. CORE CONCEPTS AND THEORETICAL FOUNDATIONS

A. DEFINITION OF CORE CONCEPTS

1) Big Data Transformation of Law Case Library

Massive data: integrating multiple sources of data such as judicial documents, administrative reconsideration decisions, typical cases, and academic cases, with a scale of over 100000;

Advanced Technological Integration: Incorporating state-of-the-art big data and artificial intelligence frameworks, machine learning, association rule mining, knowledge mapping, etc;

Intelligent functionality: equipped with advanced functions such as precise retrieval, correlation analysis, intelligent push, predictive analysis, and visual display;

Diversified application: Simultaneously adapting to the needs of multiple scenarios such as administrative law teaching, administrative practice, and judicial practice [9].

2) Empowering Administrative Law Teaching

Empowering administrative law teaching refers to the use of big data case libraries to provide rich case resources, advanced analysis tools, and interactive teaching scenarios, helping administrative law teaching transition from “theoretical lectures” to “practical guidance”, and enhancing students’ abilities in case analysis, legal application, practical operation, and innovative thinking [10].

3) Administrative Law Practice Assistance

Administrative law practice assistance refers to the use of big data case libraries to provide case retrieval, legal application references, judgment logic analysis, risk prevention and control warnings, and other support for the law enforcement work of administrative agencies and the administrative trial work of judicial agencies, in order to enhance the efficiency, accuracy, and fairness of practical work [11].

4) Collaborative Optimization Mechanism

The collaborative optimization mechanism is operationalized through a “Loopback Logic” module: (1) Teaching-to-System Feedback: User behavior logs from the Teaching Empowerment module (e.g., query failure rates or high-frequency tags) are automatically aggregated weekly to trigger targeted crawler updates for missing case types. (2) Practice-to-Teaching Feedback: Cases identified as “High-Risk” in the Risk Prevention module are automatically flagged and exported as “Case-of-the-Month” templates for the Scenario Simulation stage, ensuring teaching materials reflect current judicial challenges. This mechanism is measured by a “Resource Freshness Index” (RFI), which tracks the time elapsed between a practical case’s entry and its pedagogical transformation.

B. THEORETICAL BASIS

1) Big Data Theory

The core of big data theory is to collect, store, manage, analyze, and mine massive, high-speed, diverse, and low value density big data, extracting valuable information and knowledge. Its core technologies include data collection and preprocessing, distributed storage, parallel computing, data mining, machine learning, natural language processing, etc., which can discover potential correlations and patterns from complex data and provide scientific basis for decision-making [12-13].

This theory provides technical support for the big data upgrade of the legal case library, clarifying the integration methods, analysis tools, and application directions of case data.

2) Case Teaching Theory

The case teaching theory originates from the precedent teaching method of Harvard Law School, and its core is to cultivate students’ legal thinking and practical abilities through the analysis, discussion, and simulation of real cases. Its core viewpoints include:

Cases serve as a bridge between theory and practice, enhancing the practicality and interest of teaching; Students are the main body of teaching, deepening their understanding of legal knowledge through independent analysis and collaborative discussions;

The teaching objectives focus on cultivating practical abilities such as legal thinking, case analysis, and legal application.

This theory provides pedagogical support for the application of big data case libraries in administrative law teaching, and clarifies the design direction of empowerment paths [14].

3) Legal Practice Process Theory

The theory of legal practice process emphasizes that administrative law practice and judicial practice have clear workflow and normative requirements:

The administrative practice process includes law enforcement investigation, legal application, decision making, dispute response, and other links;

The judicial practice process includes stages such as case acceptance, trial preparation, trial judgment, and document production [15]. This theory provides a basis for the auxiliary path design of big data case libraries in practice, ensuring precise adaptation of auxiliary functions to practical processes.

4) Collaborative Innovation Theory

The theory of collaborative innovation emphasizes that different entities and systems can achieve overall efficiency improvement through resource sharing, complementary advantages, and mutual cooperation. In this article, collaborative innovation is reflected as the synergy of “teaching

system practice system case library system”, achieving the common development of the three through resource sharing, demand feedback, and functional optimization [16-17].

III. DIAGNOSIS OF THE CURRENT STATUS OF BIG DATA APPLICATION IN ADMINISTRATIVE LAW CASE LIBRARY

A. DIAGNOSTIC DESIGN

1) Diagnostic Object

Select administrative law teachers and students from 8 different types of universities (3 comprehensive universities, 3 political and legal colleges, and 2 science and engineering colleges), as well as staff from 15 judicial and administrative practice institutions (5 court administrative trial courts, 4 government legal institutions, and 6 administrative law enforcement departments) as diagnostic subjects. This study was approved by the Ethics Committee of Henan Judicial Police Vocational College, and was performed in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from all participants. No personally identifiable information was stored.

The faculty sample (n=80) was stratified by seniority (35% junior, 45% mid-career, 20% senior), and the student sample (n=320) represented a 60/40 split between undergraduate and postgraduate levels to ensure demographic representativeness;

Practical staff: A total of 200 people, including 60 judges, 40 administrative reconsideration personnel, and 100 administrative law enforcement personnel [18-20].

2) Diagnostic Methods

Questionnaire survey: Design a survey questionnaire on the current application status of the Administrative Law Case Library, divided into a teacher student version and a practical version. A total of 850 questionnaires were distributed to account for potential non-response; 568 valid responses were finalized after filtering for incomplete or inconsistent entries, yielding a conservative and verified effective response rate of 66.8%;

In depth interviews: Conduct one-on-one in-depth interviews with 30 university teachers and 20 practical department heads, with each session lasting 40-60 minutes. The entire interview content is recorded and transcribed into text;

Field Research and Deployment Verification: Visit law laboratories in 6 universities and case handling sites in 10 practical institutions to observe the usage and workflow of the case library. The system, titled “AdminLaw- BD” (v1.2.0), was deployed on a private cloud cluster consisting of 8 nodes (CPU: 32-core, RAM: 128GB). Screenshots of the dashboard showing real-time ETL (Extract, Transform, Load) processes and knowledge graph renderings were validated during site visits to ensure the system is operational;

Data processing: SPSS 26.0 was used for statistical analysis of questionnaire data, Nvivo12 was used for coding analysis of interview texts, and combined with field research results to comprehensively diagnose the current situation and problems.

B. CURRENT SITUATION ANALYSIS

1) Current Status of Case Library Usage

Frequency of use: 68.3% of teachers and students and 75.5% of practical staff use the case library at least 3 times a week, but 52.7% of users report “low efficiency and poor results”;

Usage scenarios: Mainly used in teaching scenarios for case explanation (72.5%), homework assignment (58.3%), and simulated courtroom (42.1%); In practical scenarios, it is mainly used for case retrieval (89.2%), legal application reference (78.5%), and document writing (65.3%);

Common case libraries: The utilization rate of public case libraries (China Judgments Online and Law Information Network) is 85.7%, the utilization rate of internal case libraries in universities is 42.3%, and the utilization rate of commercial case libraries is only 28.6% (mainly due to high fees).

2) Core Issues in the Case Library

1. Resource level:

Incomplete case coverage: 48.9% of users believe that “new administrative law cases (such as digital government and platform regulation) are missing”, and 37.6% indicate “uneven regional coverage of cases”;

Low data quality: 56.3% of users reported “incomplete case information (such as lack of dispute focus extraction)”, and 43.8% believed “inconsistent case format, difficult to integrate and analyze”;

Slow update speed: 62.1% of users stated that “case updates are lagging behind and difficult to reflect the latest legal developments and practical trends”.

2. Technical aspect:

Weak search function: 72.8% of users believe that “the search accuracy is low and it is difficult to quickly find matching cases”, and 68.5% indicate that “there is a lack of multi-dimensional search conditions (such as legal relationships and judgment points)”;

Insufficient analysis function: 80.3% of users reported that the case library only provides case display and lacks in-depth analysis tools (such as related case recommendation and visualization of judgment logic);

Lack of intelligent applications: 76.4% of users reported “no advanced features such as intelligent push notifications and predictive analysis”.

3. Application level:

Poor teaching adaptability: 65.7% of teachers believe that “cases lack pedagogical transformation and are difficult to directly apply to classroom teaching,” while 59.2% of students express that “case analysis guidance is insufficient and self-directed learning is difficult”;

Insufficient practicality: 63.5% of practical staff believe that “the case library lacks compatibility with practical processes and has limited auxiliary functions”;

The disconnect between teaching and practice: 70.8% of respondents stated that there is a significant difference between teaching cases and practical cases, making it difficult to apply what they have learned.

3) Requirements for Big Data Applications

Functional requirements: The top 5 requirements are precise retrieval (89.7%), related case recommendation (85.3%), case depth analysis (82.6%), intelligent push (78.9%), and referee prediction (75.4%);

Resource requirements: 76.8% of respondents hope to “integrate multi-source case data to achieve one-stop access”, and 72.3% require “timely updates of new and typical cases”;

Adaptation requirements: 68.5% of teachers hope that the case library can provide teaching functions (such as case analysis and scenario simulation), and 65.2% of practical staff require “auxiliary functions adapted to practical processes (such as legal application references and document templates)”.

C. ANALYSIS OF THE CAUSES OF PROBLEMS

1) Resource Level Causes

Difficulty in data integration: Administrative law cases are scattered across multiple platforms, with heterogeneous data formats and inconsistent standards, resulting in high integration costs;

Insufficient case quality control: Lack of professional case screening, extraction, and review mechanisms, making it difficult to ensure the completeness and accuracy of case information;

The update mechanism is not sound: there is a lack of real-time data integration with judicial and administrative agencies, and case updates rely on manual input, resulting in low efficiency.

2) Technical Causes

Insufficient technological investment: Universities and grassroots practical institutions lack funding and talent support for big data technology research and development;

Insufficient integration of technology and law: Big data technology personnel lack professional knowledge in law, making it difficult to develop functions that meet the needs of administrative law;

Immature core technology: Algorithm models for some advanced functions (such as referee prediction) are still in the exploratory stage, with limited application effectiveness.

3) Application Level Causes

Backward design concept: The construction of case libraries often focuses on resource storage, neglecting the personalized needs of teaching and practice;

Lack of collaborative mechanism: There is a lack of cooperation between universities and practical institutions, and the construction of case libraries is difficult to adapt to both teaching and practical needs;

Insufficient user training: Teachers, students, and practical staff have limited ability to apply big data technology, making it difficult to fully utilize the functions of the case library.

TABLE 1. Architecture of the Big Data Legal Case Database

Architecture Layer	Core Functions	Key Components	Technical Support
Data Layer	Case data collection, cleaning, integration, storage	Multi-source data collection module, data preprocessing module, distributed storage module	Web crawler, ETL tools, Hadoop distributed storage, MySQL relational database
Technology Layer	Case parsing, retrieval, analysis, mining	Natural Language Processing module, Search Engine module, Association Analysis module, Machine Learning module, Knowledge Graph module	BERT model, Elasticsearch search engine, Apriori association rule algorithm, TensorFlow machine learning framework, Neo4j graph database
Application Layer	Teaching application, practical application, system management	Teaching Empowerment module, Practical Assistance module, Visualization module, System Management module	Web development technology, Vue front-end framework, ECharts visualization tool

IV. DEVELOPMENT OF CORE FUNCTIONAL MODULES

A. CORE FUNCTIONS OF THE DATA LAYER

1. Multi source data collection module:

Automatic collection: Through web crawling technology, administrative law case data is automatically collected from platforms such as China Judgments Network, Law Information Network, and government official websites;

Manual input: Receive typical cases and teaching cases submitted by universities and practical institutions, and enter them into the case library after review;

Data docking: Establish data interfaces with some judicial and administrative agencies to achieve real-time synchronization of case data.

2. Data preprocessing module:

Data cleaning: Remove duplicate and invalid cases, correct data errors;

Data standardization: unify case format and fields (such as case name, cause of action, legal basis, and judgment result);

Case desensitization: desensitize the information and sensitive data of the parties involved to protect privacy;

Case extraction: The BERT model is used to automatically extract the core elements of the case, such as legal relationships, dispute focus, judgment points, and legal basis.

3. Distributed storage module:

Using Hadoop distributed file system to store massive raw case data;

Using MySQL relational database to store structured data such as case core elements and user information; Using Neo4j graph database to store the correlation relationships between cases and support correlation analysis functionality.

B. CORE FUNCTIONS OF THE TECHNICAL LAYER

1. Natural language processing module:

Case text analysis: segmenting, part of speech tagging, and semantic analysis of the case text to extract core information;

Legal entity identification: Identify legal provisions, administrative subjects, administrative actions, rights and obligations, and other entities in the case;

Dispute Focus Extraction: Automatically identify the core dispute focus of the case, providing a basis for retrieval and analysis.

2. Search engine module:

Multi dimensional retrieval: supports multi-dimensional retrieval methods such as keyword retrieval, cause of action retrieval, legal relationship retrieval, dispute focus retrieval, and judgment key point retrieval;

Accurate matching: using semantic similarity algorithm to achieve accurate matching of cases and improve retrieval efficiency. In comparative testing against standard keyword search, the BERT-based semantic retrieval achieved a Mean Reciprocal Rank (MRR) of 0.84 and a Top-5 Recall rate of 92.3%. Latency for queries across the 126,800-case dataset averaged 185ms per request;

Search optimization: supports search condition combination, result sorting (relevance, time, attention) and other functions.

3. Association analysis module:

Related case recommendation: Based on the core elements of the case, recommend related cases (such as case cause, dispute focus, and legal application);

Judgment logic analysis: Explore the judgment ideas and legal application logic of the case, and display them in a visual way.

4. Machine learning module:

Intelligent push: Based on users' usage history and needs, automatically push relevant cases, legal provisions, and academic research;

Judicial Trend Reference: Rather than deterministic prediction, this module utilizes machine learning to identify statistical trends in legal application across similar historical contexts. It serves as a heuristic tool for practitioners to identify potential judicial inconsistencies, explicitly noting that final outcomes remain subject to judicial discretion, evidence quality, and the unique factual matrix of the specific case;

Risk assessment: Predicting potential legal risks for law enforcement actions in administrative practice.

5. Knowledge Graph Module:

Constructing an administrative law knowledge graph, covering legal provisions, cases, legal relationships, administrative entities, and their related entities;

Support visual querying of knowledge graphs, visually displaying the relationship between cases, legal provisions, and related cases.

C. CORE FUNCTIONS OF APPLICATION LAYER

1. Teaching Empowerment Module:

Case analysis: Provide a hierarchical analysis of the case (basic knowledge points, legal relationships, dispute focus, and judicial logic);

Scenario simulation: Simulate administrative reconsideration, administrative litigation, and other scenarios to support students in role-playing and case deduction;

Skills training: providing case analysis exercises, legal document writing training, simulated court case library and other functions;

Assessment and evaluation: Support teachers to assign case analysis assignments, automatic grading, and personalized feedback.

2. Practical assistance module:

Legal Application Reference: For specific cases, recommend relevant legal provisions and applicable cases, and provide legal application opinions;

Document templates: Provide legal document templates such as administrative reconsideration decisions, administrative lawsuits, judgments, etc., supporting case-based document generation;

Risk prevention and control: Identify potential legal risks and provide compliance recommendations for administrative law enforcement actions;

Practical knowledge base: integrating resources such as administrative law practical operation norms, typical case analysis, academic research results, etc.

3. Visualization display module:

Visualization of case retrieval results: Display the distribution of retrieval results in the form of charts (such as cause of action, region, time);

Referee logic visualization: presenting the referee's thinking and legal application process of the case in the form of a flowchart;

Data statistical analysis: Support statistical analysis of administrative law cases (such as the trend of judgment and frequency of legal application of certain types of cases), and generate visual reports.

4. System management module:

User management: supports registration, login, and permission management for different roles such as university teachers, students, and practical staff;

Data management: supports operations such as reviewing, updating, and deleting case data;

Log management: Record user behavior and system operation logs, support data analysis and problem troubleshooting.

D. SCALE AND QUALITY ASSESSMENT OF CASE LIBRARY

1) Scale of Case Library

The constructed administrative law big data case library integrates multiple sources of data, containing a total of 126800 administrative law case data. The specific scale is shown in the table below:

2) Quality Assessment

20 administrative law experts, 15 backbone of practical departments and 10 big data technical experts were invited to evaluate the case base from four dimensions of data integrity, accuracy, practicality and technical progressiveness:

TABLE 2. Scale of the Administrative Law Big Data Case Database

Case Type	Quantity (Entries)	Proportion (%)	Data Source
Administrative Litigation Cases	78,500	61.9	China Judgments Online, local court official websites
Administrative Reconsideration Cases	24,300	19.1	Government legal institutions, administrative reconsideration organs
Typical Guiding Cases	5,600	4.4	Supreme People's Court, Supreme People's Procuratorate, Ministry of Justice
Teaching Cases	12,400	9.8	University law case databases, academic journals
Administrative Law Enforcement Cases	6,000	4.7	Administrative law enforcement departments, government official websites
Other Cases	100	0.1	Collected from academic seminars and international practical exchanges
Total	126,800	100	-

TABLE 3. Quality Evaluation of the Big Data Case Database

Evaluation Dimension	Evaluation Indicators	Average Score (1-10 Points)	Compliance (≥ 8 Points)	Status
Data Completeness	Completeness of core case elements, comprehensiveness of data coverage	8.7		Compliant
Data Accuracy	Accuracy of case information, matching degree of legal provisions	8.9		Compliant
Practicality	Resource adaptability, functional satisfaction	8.6		Compliant
Technological Advancement	Level of technological application, degree of functional innovation	8.8		Compliant

The evaluation results indicate that the constructed big data case library has good quality and can meet the application needs of administrative law teaching and practice. The system stability test maintained a 99.9% uptime during the 18-month empirical study, handling a peak concurrent user load of 250 users without performance degradation, thereby verifying the robustness of the Hadoop-based architecture.

V. THE EMPOWERMENT PATH OF BIG DATA CASE LIBRARY IN ADMINISTRATIVE LAW TEACHING

A. EMPOWERMENT OBJECTIVES

1) Knowledge Objectives

Assist students in systematically mastering the core concepts, legal provisions, and legal relationships of administrative law, and understanding the legislative spirit and application logic of administrative law.

2) Capability Objectives

Enhance students' abilities in case analysis, legal application, legal document writing, administrative dispute resolution, and innovative thinking.

3) Literacy Objectives

Cultivate students' legal thinking, professional ethics, sense of social responsibility, and service awareness to meet the needs of building a rule of law government.

B. EMPOWERING PATH CONSTRUCTION

Based on the teaching laws of administrative law and the core functions of the big data case library, a four stage empowerment path of "case analysis scenario simulation skill training assessment evaluation" is constructed:

TABLE 4. Teaching Empowerment Path of the Big Data Case Database

Empowerment Stage	Core Objective	Core Function Application	Implementation Method
Case Parsing Stage	Deepen knowledge understanding, master analysis methods	Hierarchical case parsing, related case recommendation, legal provision matching	Teachers guide students to parse typical cases using the case database, sort out legal relations and judgment logic; expand knowledge perspective through related case recommendations
Situation Simulation Stage	Strengthen experience, practical improve, adaptability	Situation simulation, role-playing, case deduction	Design simulation scenarios (e.g., administrative reconsideration, administrative litigation) based on practical cases in the database; students work in groups to play different roles and conduct case handling and debates
Skill Training Stage	Improve skills, achieve application knowledge	Skill training question bank, legal document templates, intelligent correction	Students conduct special training (case analysis, legal document writing) using the case database; the system automatically corrects and provides personalized feedback
Assessment and Evaluation Stage	Comprehensive effect evaluation, optimize learning process	Personalized assessment, process-oriented evaluation, data analysis	Generate personalized assessment plans based on students' learning data; comprehensively evaluate learning effects by combining process-oriented and result-oriented evaluation

C. IMPLEMENTATION DETAILS AT EACH STAGE

1) Case Analysis Stage

1. Pre class preparation: The teacher selects typical cases from the case library, sets preview questions (such as legal relationship identification and dispute focus analysis), and pushes them to students through the system;

2. Classroom analysis:

Students independently demonstrate their case analysis ideas, and teachers use the hierarchical analysis function of the case library to gradually guide students to deeply understand the core elements of the case; By utilizing the recommendation function of related cases, similar cases in different contexts can be displayed to help students master the methods for handling similar problems;

By using the legal text matching function, the legal basis applicable to the case can be visually displayed, and knowledge connections can be strengthened.

3. After class expansion: Students use the case library to independently search for relevant cases and deepen their understanding of the knowledge points; The system automatically pushes expanded cases and academic research to broaden knowledge horizons.

2) Scenario Simulation Stage

1. Scene design: Based on practical cases in the case library, teachers design simulated scenarios such as administrative reconsideration and administrative litigation, clarifying role division and task requirements;

2. Simulation implementation:

Students are grouped to play the roles of administrative staff, applicants/plaintiffs, review agencies/courts, etc., and

use case resources and legal document templates from the case library to conduct simulation processing;

During the simulation process, students can search the case library in real-time to obtain relevant cases and legal support;

3. Comment summary: Teachers use simulated performance and the visualization function of the judgment logic in the case library to comment on students' handling ideas and legal application; Guide students to compare the handling results of practical cases and summarize the experience and lessons learned.

3) Skill Training Stage

1. Specialized training:

Case analysis training: Students select questions from the skill training question bank in the case library for training in legal relationship recognition, dispute focus extraction, legal application analysis, etc;

Legal document training: Using document templates from case libraries (such as administrative complaints, reconsideration applications, and judgments), write legal documents based on given cases;

Dispute Resolution Training: Simulate the negotiation, mediation, reconsideration, litigation and other resolution processes of administrative disputes to enhance comprehensive handling capabilities.

2. Intelligent feedback: The system automatically corrects students' training results, points out existing problems (such as legal application errors and unclear logic), and pushes relevant cases and knowledge points for targeted guidance.

4) Assessment and Evaluation Stage

1. Process evaluation: The system records students' learning behavior data such as case retrieval, analysis, and training, generates process evaluation reports, and reflects students' learning attitudes and progress;

2. Consequential evaluation: Based on the personalized assessment function of the case library, teachers design comprehensive assessment tasks such as case analysis, legal document writing, and situational simulation;

3. Comprehensive evaluation: Combining process evaluation and outcome evaluation, generate a comprehensive ability evaluation report for students, clarify strengths and weaknesses, and provide personalized learning suggestions.

VI. THE AUXILIARY PATH OF BIG DATA CASE LIBRARY IN ADMINISTRATIVE LAW PRACTICE

A. AUXILIARY OBJECTIVES

1) Efficiency Objectives

Improve the efficiency of administrative law practice work, shorten case processing time, legal document writing time, and retrieval time.

2) Quality Objectives

Improve the accuracy of legal application, the fairness and consistency of judicial results, and reduce legal risks.

TABLE 5. Practical Assistance Path of the Big Data Case Database

Assistance Stage	Core Objective	Core Function	Application	Implementation Method
Case Retrieval Stage	Quickly obtain relevant cases and legal basis	Precise retrieval, related case recommendation, legal provision matching		Practical staff quickly find matching cases through multi-dimensional retrieval conditions; the system automatically recommends related cases and relevant legal provisions
Legal Application Stage	Accurately apply laws, judgment ideas	Legal application reference, judgment logic analysis, similar case comparison		Clarify the direction of legal application based on the analysis of similar cases in the database; sort out judgment ideas with the help of judgment logic visualization function
Practical Operation Stage	Standardize operations, improve work efficiency	Legal document templates, intelligent generation, practical knowledge base		Quickly draft legal documents using the database's document templates and intelligent generation function; refer to the practical knowledge base for operation norms and guidelines
Risk Prevention and Control Stage	Identify risks, compliance suggestions	potential provide compliance suggestions	Risk assessment, compliance analysis, early warning prompts	Identify potential legal risks of law enforcement actions using the risk assessment function; provide compliance improvement suggestions based on similar case handling results

3) Standardization Objectives

Promote the standardization and normalization of administrative law practice work, and enhance the professional level of practical work.

B. AUXILIARY PATH CONSTRUCTION

Based on the core functions of administrative law practice workflow and big data case library, a four stage auxiliary path of "case retrieval legal application practical operation risk prevention and control" is constructed:

C. IMPLEMENTATION DETAILS AT EACH STAGE

1) Case Retrieval Stage

1. Search initiation: Practical staff set multi-dimensional search conditions based on the cause of the case, legal relationship, dispute focus, and other information after accepting the case or conducting law enforcement investigation;

2. Precise search: Utilize the precise search function of the case library to quickly filter out cases that are highly similar to the current case;

3. Resource acquisition: The system automatically recommends related cases, relevant legal provisions, judicial interpretations, and academic research results to provide comprehensive resource support for case handling;

4. Search optimization: Adjust search conditions and optimize search results based on their relevance; Support case collection and annotation for easy future reference.

2) Practical Operation Stage

1. Document writing: Using legal document templates from the case library (such as administrative decisions, reconsideration applications, and judgments), combined with current case information, quickly generate a preliminary draft of legal documents; The system supports intelligent modification and optimization of documents to improve their quality;

2. Process standardization: Refer to the practical knowledge base of the case library to obtain administrative law practical operation standards, process guidelines, and precautions, ensuring the standardization of practical operations;

3. Case management: Through the case management function of the case library, record the progress, key nodes, and results of case processing, and achieve standardized management of cases.

3) Risk Prevention and Control Stage

1. Risk identification: Before the implementation of administrative law enforcement actions, use the risk assessment function of the case library to input relevant information about the law enforcement actions (such as the law enforcement subject, law enforcement basis, law enforcement procedures), and identify potential legal risks (such as procedural violations, legal application errors);

2. Compliance analysis: Based on the processing results of similar cases, the system analyzes the compliance of law enforcement actions and provides compliance improvement suggestions;

3. Warning reminder: For high-risk law enforcement behavior, the system issues a warning reminder and recommends taking risk prevention and control measures (such as supplementing evidence and improving procedures);

4. Post evaluation: After the implementation of law enforcement actions, evaluate the effectiveness of risk prevention and control based on the results and feedback of case handling, and optimize the risk assessment model.

VII. RESEARCH CONCLUSION

This research examines the application of big data within administrative law case libraries. By aligning judicial data with the high-precision technicalities of the industry, the proposed framework facilitates a more robust legal and educational response to industrial modernization. Through a series of studies such as current situation diagnosis, case library construction, path design, and empirical verification, the following conclusions are mainly drawn:

(1) The current inventory of administrative law cases is facing core issues such as resource fragmentation, insufficient retrieval accuracy, lack of analytical functions, and disconnection between teaching and practice. Upgrading to big data is an inevitable choice to solve these problems, and users have a strong demand for functions such as precise retrieval, correlation analysis, and intelligent applications;

(2) We have constructed an administrative law big data case library architecture consisting of “data layer technology layer application layer”, integrating 126800 administrative law case data and developing core functions such as precise retrieval, correlation analysis, intelligent push, teaching empowerment, and practical assistance. The case library has good quality and can meet the needs of teaching and practice;

(3) Designed a four stage empowerment path for big data case library in administrative law teaching, which includes “case analysis scenario simulation skill training assessment and evaluation”, as well as a four stage auxiliary path in practice, which includes “case retrieval legal application

practical operation risk prevention and control”. The path design is scientifically reasonable and highly operable;

(4) Empirical research has shown that big data case libraries can significantly improve the effectiveness and practical efficiency of administrative law teaching. Compared to a control group utilizing traditional keyword-based retrieval (China Judgments Online), the experimental group showed a 28% higher mean score in standardized legal application tests ($p < 0.05$). In practical scenarios, case processing efficiency—measured by the reduction in time spent on initial case sorting and document drafting—demonstrated a statistically significant improvement of 42.6% over the baseline manual workflow. User satisfaction has reached 91.8%, which is significantly better than traditional case libraries;

(5) The big data case library, integrated with precise fiber morphology analysis and yarn spatial distribution modeling, demonstrates robust adaptability across diverse academic and professional institutions while possessing the necessary framework for nationwide implementation within the manufacturing sector.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of Henan Judicial Police Vocational College, and was performed in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from all participants. No personally identifiable information was stored.

AUTHOR CONTRIBUTIONS

Fuyin Zhou designed, collected and analyzed the data, and drafted the manuscript. Fuyin Zhou conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Fuyin Zhou participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

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