Hindawi

Retraction

Retracted: Construction Scheme of Quantitative Assessment of College Teachers' Performance Based on Big Data Analysis

Mobile Information Systems

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

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

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

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

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

References

[1] Y. Zheng and C. Sun, "Construction Scheme of Quantitative Assessment of College Teachers' Performance Based on Big Data Analysis," *Mobile Information Systems*, vol. 2022, Article ID 8373164, 10 pages, 2022.

Research Article

Construction Scheme of Quantitative Assessment of College Teachers' Performance Based on Big Data Analysis

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Big data is widely used for its large capacity. Performance appraisal is the evaluation of work, which can serve as a warning and motivation for employees. College teachers play an important role in the development of higher education. How to realize the rational use of college resources is a problem that needs to be solved urgently. This paper aims to study the construction scheme of quantitative assessment of college teachers' performance based on big data analysis, and use big data analysis methods to make more scientific and reasonable performance assessment methods. Based on the research of relevant theories, this paper analyzes the characteristics and existing problems of the performance appraisal system of college teachers according to the current situation of college teachers' performance appraisal. In addition, considering the particularity of college teachers, based on questionnaires and field interviews to understand their assessment status and teachers' expectations for assessment; based on the construction principles of college teachers' performance assessment system, a college teacher performance assessment system is constructed. The experimental results of this paper show that 140 people believe that performance appraisal is related to salary, accounting for 35% of the total number of teachers. This data shows that the correlation between performance appraisal and salary is relatively high.

1. Introduction

Education directly contributes to the growth of national economy and the advance of S&T, especially the higher education, which provides huge human resources and material wealth to the society. In the process of cultivating talents, teachers in colleges and universities determine to a certain extent whether the school can cultivate outstanding talents. Therefore, how to motivate and spur teachers through quantitative assessment is an important content of college reform. The emergence of the reform and opening-up policy has provided opportunities for the development of China's economy and technology. In the process of development, data has become an indispensable part of it. This paper aims to study the construction scheme of quantitative assessment of college teachers' performance based on big data analysis, and use big data analysis methods to make more scientific and reasonable performance assessment methods.

Teachers, as an essential part of the tertiary sector, can be fully motivated and motivated if their role is fully exploited, and cultivate more talents. The implementation of performance appraisal facilitates the developmental review of teachers, the growth of their professionalism, and the quality of education.

This paper presents an analysis of the proposed system, which has a very good role in promoting the strengthening of the teaching staff of the college. The topic selection is based on the performance assessment of college teachers, and the quantitative assessment is introduced into the assessment of college teachers' teams, which puts forward new ideas for improving the teacher assessment system. Combined with the characteristics of college teachers' positions and work characteristics, according to the current situation of college teachers' performance assessment, a teacher performance assessment index system suitable for the characteristics of colleges and universities is established.

2. Related Work

As an important means of enterprise inspection work, performance appraisal is conducive to the scientific development of enterprise work. As a special enterprise in colleges and universities, teachers' performance appraisal is also very important. Abell T N aims to provide an analysis of the FA practice of chemistry teachers through the lens of the chemistry frame of mind. Two groups of middle and high school science teachers participated in a year-long professional development aimed at enhancing their FA practice in teaching chemistry. To develop a methodology used in ongoing research to analyze teacher progress throughout the year, he provides an analysis of the participants' final FA portfolio chapters to describe the FA task design, the purpose for which teachers implement FA, and how teachers evaluate students' work. The experiment revealed a pattern that echoes broader research in science education, but with instantiation in chemistry [1]. The study described by Schafer A assessed item responses by identifying patterns of teacher attention. Results show that comparing the two can reveal potential targets for formative assessment of responses [2]. Deng and Deng studied the results of teaching evaluation of science and technology undergraduates and directed students to pay attention to the main contents of science and technology courses that are highly related to teaching outcomes. Based on factor analysis, he used association rules to obtain high correlations among three factors and found that students studying science and technology courses focused on [3]. The current research on PPDM mainly focuses on how to reduce the privacy risks brought by data mining operations, but actually in data collection, data release, and information (ie, data mining results) delivery. Xu takes a broader perspective on privacy issues related to data mining and studies various methods that help protect sensitive information. For each type of user, he discusses his privacy concerns and the methods he can use to protect sensitive information. He briefly introduces the basics of related research topics, reviews state-of-the-art methods, and presents some preliminary ideas for future research directions [4]. Based on the effect of historical time, Wu classified the samples. To solve the related problems, he integrated the bagging-based ensemble method into back propagation [5].Li envisions these challenges for feature selection in big data analytics. He first introduces feature selection, and then details the structuring problem. Finally, to facilitate and improve the research on feature selection, he proposes an open source feature selection library containing feature selection algorithms [6]. The proliferation of networks of all types has made the types, problems, and problems of big data more varied than ever. Chi Lu reviews the latest research on the types of data associated with Big Data on the Web. He concludes with a summary of Big Data trends and evolutions to anticipate ongoing and upcoming issues [7].While these theories go some way to elaborating on big data and teacher performance appraisal, there is less of a link between the two to achieve meaningful results.

3. Construction Method of Quantitative Assessment of College Teachers' Performance Based on Big Data Analysis

3.1. Performance Overview. Performance is a very important part of business management and is a view of how employees are doing as a whole [8, 9]. In practical terms, performance can be divided into a variety of different elements depending on the situation and it can be influenced by the individual employee's abilities, resulting in different outcomes [10, 11].

Performance appraisal is an effective means to check the quality of employees' work, which is usually measured in years in practice [12]. Through performance appraisal, we can know the actual ability and inadequacy of the staff, and understand the gap with the organizational goal, so as to improve the work and improve the work efficiency [13]. Teacher performance appraisal refers to a series of behavioral evaluations of college staff in the organizational environment of colleges and universities. It includes teachers' own morality, work attitude, teaching quality, scientific research quantity, etc. Through these evaluations, it is determined whether the teaching staff meet the post standards, so as to promote the enthusiasm of the teaching staff and achieve the organizational goals of the university [14, 15]. In the performance appraisal, teachers should follow the principle of openness to enhance the transparency of the assessment work; the principle of goal consistency, to provide teachers with a guide, so that teachers can give full play to their important role in the work process; the principle of feasibility and practicality.Figure 1 is a schematic diagram of stakeholders.

There are two types of performance appraisals in the organization. Formal appraisals are carried out on a regular basis, with clear rules and clear goals. Informal assessment does not have a specific assessment date, and the purpose is not unique. The common informal assessments include verbal praise and encouragement from supervisors to employees [16, 17]. Performance can exist in many ways. For example, in a PPP project, performance is broken down into two components. For firms, performance is an important indication of profitability. For governments, performance is a method of comparison[18]. The properties intrinsic to PPP items dictate that when conducting performance evaluation, attention should be paid not only to the balance between investment and delivery, but also to the public and utility nature of PPP items.Due to the particularity of the teaching profession in colleges and universities, teachers are different from the performance assessment of other organizations while emphasizing their conduct and performance, and have higher requirements in terms of teaching ability and knowledge reserve [19].The human capital investment of college teachers is larger than that of other industries; the sense of achievement needs of college teachers is strong; the labor objects of college teachers are complex and special; the realization cycle of labor value results of college teachers is long.

3.2. Data Mining Technology. Data mining is a method of obtaining information on data resources. It is used in a total variety of ways, driven by IoT technology.Data mining technology finds useful information from massive data and provides decision-making assistance to decision-makers. Introduce data mining technology into the field of performance appraisal, through a variety of data mining techniques, to find out the potential factors that affect teachers' performance appraisal, so as to provide relevant information for relevant functional departments, promote teachers' teaching, scientific research and other work to be better carried out, improve teaching and learning. and research service quality.The decision tree is an information analysis tool, which is output in the form of nodes and they represent different information. The concrete architecture is displayed in Figure 2.

The poor information representation of the raw data, which we represent as a function of

$$G(C) = L(c_1)P(c_1) + L(c_2)P(c_2) + \ldots + L(c_l)P(c_l) = -\sum_v^l L(c_v)\log_2 L(c_v). \tag{1}$$

When $L(c_1) = L(c_2)$, $G(C) = 1$.

$$p(l, v) = -\frac{l}{l+v}\log_2\frac{l}{l+v} - \frac{v}{l+v}\log_2\frac{v}{l+v},$$

$$U(R) = \sum_K^s \frac{f_k + l_k}{f + l} j(f_k, l_k). \tag{2}$$

Here B stands for the set of copies, j for the message desired and $U(R)$ for the mean message desired.

$$\text{Info}(P) = -\sum_1^O K_V \log_3(K_V), \tag{3}$$

where K_V stands for the share of the representative specimen in the total number of persons.

$$\text{Info}_x(S) = \sum_1^o \frac{|S_1|}{|S|} * \text{Info}(S),$$

$$\text{Gaint}(S) = \text{Info}(S) - \text{Info}_X(S),$$

$$W_a = \alpha + \beta W_{a-1} + \delta_a, \tag{4}$$

where W_a is the need, β is the variation among needs and α is a constraint.

In order to analyze the data objectively, we need to analyze the data in detail, and compare the first-level elements to quantitative description:

$$W = (w_{op}) = \begin{bmatrix} w_{11} & w_{12} & \cdots & w_{1k} \\ w_{21} & w_{22} & \cdots & w_{2k} \\ w_{31} & w_{32} & \cdots & w_{3k} \end{bmatrix}. \tag{5}$$

Formula (5) represents the judgment matrix function expression.

$$w_{op} = h(o = 1, 2, \ldots, t). \tag{6}$$

$$w_{op} = \frac{h}{w_{op}} (p = 1, 2, \ldots, t). \tag{7}$$

$$w_{op} = \frac{y_{ou}}{r_{pu}} (o, p = 1, 2, \ldots, t). \tag{8}$$

Formulas (6)–(8) represent matrix properties, and when the matrix elements are completely consistent with the above function expressions, it indicates that the constructed matrix is consistent.

$$\overline{W}_a = \frac{\sum_s^{a-1} W_a}{s},$$

$$F_a^3 = \frac{\sum_j^{a-1} \left(W_j - \overline{W}_j\right)^3}{j - 2}. \tag{9}$$

$$\text{New\_}R(U, C_s) = \sum_c \frac{|U_l|}{|U|} R(U_l). \tag{10}$$

Equation (10) shows the sub-tree expression as a function of water density, and U_l shows the profile of the properties of the model.

$$G(V) = P(K, T) - U(V),$$

$$P(O_Q) = -\sum_E^x L_E \log_2(L_E), \tag{11}$$

$$\eta_u = T_{(u)} * T_{(u-1)} \ldots T_{(3)} * T_{(2)},$$

where $\eta_{(u)}$ represents the column vector matrix of elements in the uth layer.

$$YK^{(u)} = \left(YK_1^{(u)}, \ldots YK_k^{(u)}\right) * \eta^{(u-1)},$$

$$MK^{(u)} = \left(MK_1^{(u)}, \ldots MK_k^{(u)}\right) * \eta^{(u-1)}, \tag{12}$$

$$YM^{(u)} = \left(YM_1^{(u-1)} + \frac{YK^{(u)}}{MK^{(u)}}\right).$$

If the scheme layer combines the consistency ratio $YM^{(u)} < 0.1$, it means that the matrix passes the consistency test, and vice versa.
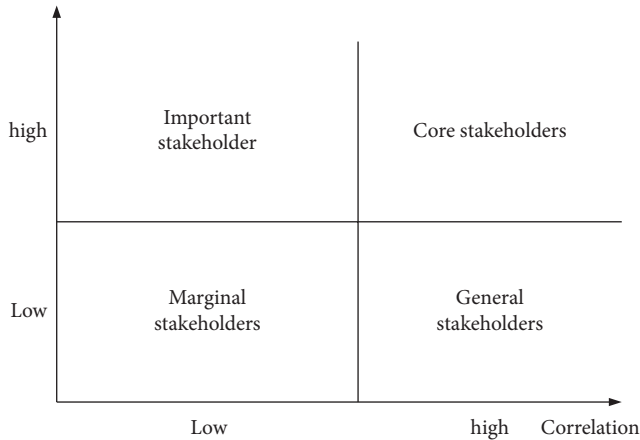
Figure 1: Two-dimensional map of PPP project stakeholders.

Figure 2: Decision tree structure.

3.3. Overview of Big Data.

3.3. Overview of Big Data. There is still no single explanation for Big Data, but our society is closely related to it. Figure 3 shows a diagram of the Big Data structure.

We are in the era of knowledge economy, time is money, finding the right solution to get the best value for you in the shortest possible time is a hot topic of current research. DMX technology can find out the critical pieces of data from the huge amount of data and get the latent value of the information. Since the IOT technology has been promoted, big data has become more and more abundant in daily life, and its application scope has been continuously expanded. The structure of the big data system is shown in Figure 4.

As sensor engineering evolves, the increasing amount of data collected drives the concept of ubiquitous connectivity for the IoT, connecting every object at all times. Processing data is a complex process that requires different processing procedures to be prepared for various cases. The structure of data pre-processing is illustrated in Figure 5.

As the growth of big digital data, big data technology has begun to be combined with the field of social production, such as the combination of big data and cloud computing, and the combination of big data and environmental monitoring. The use of big data can achieve effective processing of performance data to a certain extent, and then realize the smooth progress of human resources performance appraisal. Adjust the method of performance appraisal work to provide reliable support for the development of teachers' work. Insufficient understanding and implementation of the current performance assessment in colleges and universities and its indicators, weights, processes, etc.; the design of assessment indicators is not standardized and rigorous enough.[30]. There are many factors that affect protection, as shown in Figure 6.

4. Construction Experiment of Quantitative Assessment of College Teachers' Performance Based on Big Data Analysis

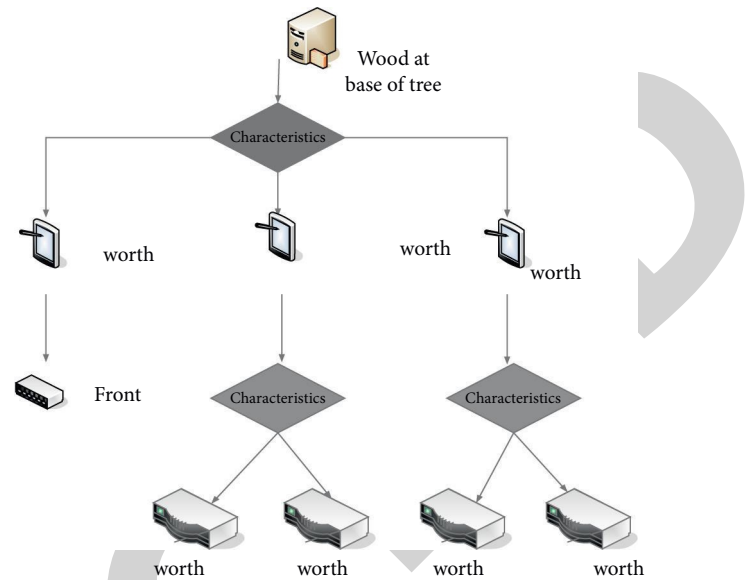*4.1. Data Mining Data.* The focus of this paper is the performance evaluation of college teachers. In order to collect the number and basic situation of teachers in colleges and universities, we have investigated the basic situation of teachers in a college in A, the specific situation is as follows:

According to the data in Table 1, we have investigated the situation of teachers in place A. According to the classification, we have divided teachers into four categories: teaching assistants, lecturers, associate professors and professors, and conducted a comprehensive analysis of teachers with four professional titles. According to the specific data, most of the teaching assistants have master's degrees, the teaching experience is generally about 4 years, and the average evaluation score is 67. Most of the lecturers have a bachelor's degree, and their teaching experience is generally about 12 years. The average assessment score is 69. Most of the associate professors have doctoral degrees, and their teaching experience is generally around 29 years. The average assessment score is 88. Most of the professors have master's degrees, and the teaching experience is generally about 23 years. The average evaluation score is 85. According to the survey data, the evaluation scores of college teachers will increase with the increase of teaching age, which is related to the teaching experience of college teachers.

According to the data in Table 2, we have subdivided the weight of the performance appraisal of college teachers. In the whole weight division, it is divided into teacher morality, academic qualifications and basic quality. Teachers' morality accounts for 35%, academic qualifications account for 35%, and teachers' basic quality accounts for 30%. We have subdivided teachers' morality, of which ideological style accounts for 33%, moral cultivation accounts for 39%, and collaboration ability among teachers accounts for 15%, teachers' participation in public welfare activities accounted for 8%, and discipline compliance accounted for 5%. In the education classification, the first degree accounted for 32%, the final degree accounted for 40%, and the further education accounted for 28%. In the basic quality classification, the foreign language level accounts for 30%, the technical
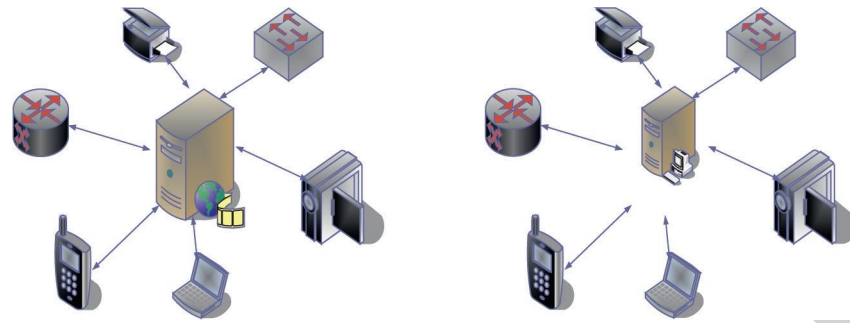
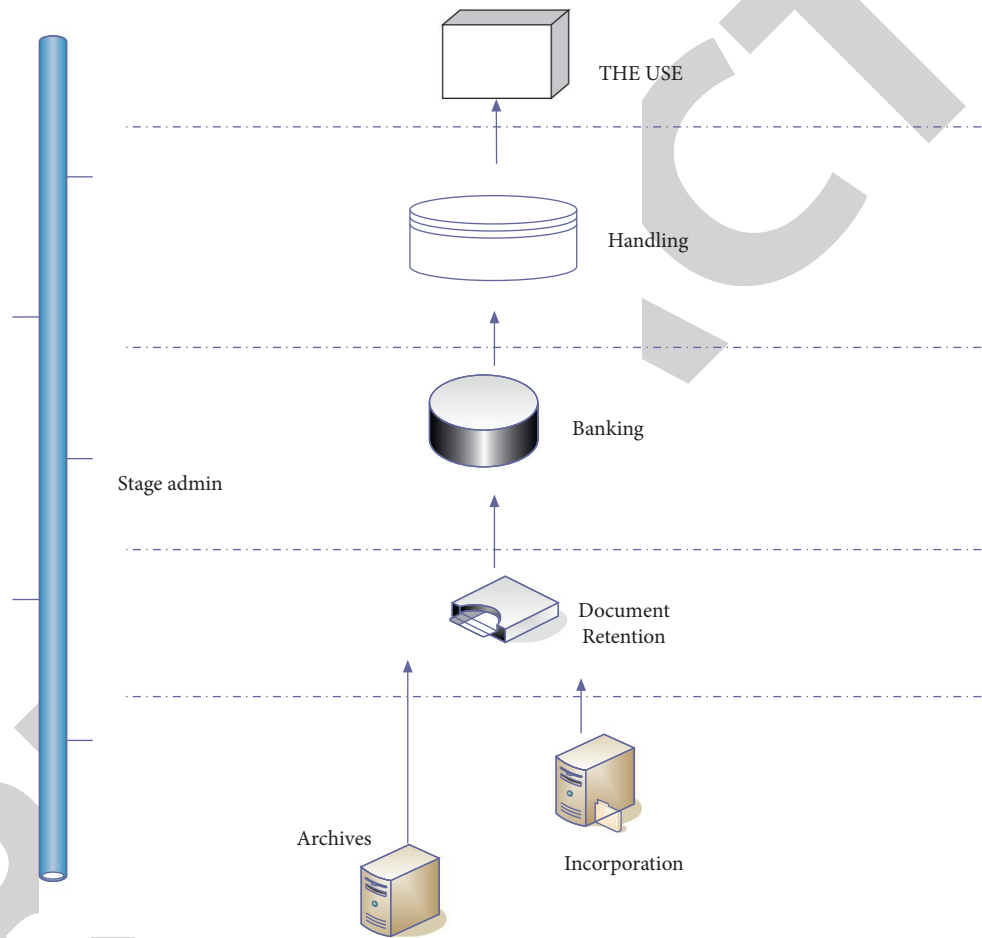Figure 3: Big data structure diagram.

Figure 4: Big data system structure.

application ability accounts for 30%, and the double-qualification situation accounts for 40%. According to the data, it can be seen that teachers' ideological and moral style and educational background are more important, in addition, teachers' ability to unite and cooperate is also more important.

4.2. Preparation of Teachers' Lesson Plans. Lesson plans are the basis of teachers' teaching, and teachers' different standards for lesson plan preparation reflect teachers' different teaching attitudes. In order to explore the teachers in place A, we analyzed the situation of the teachers, the specific situation is as follows:

According to the data in Table 3, we classified the preparation level of the teaching plan when assessing the teacher's teaching plan, and divided the teaching plan into four categories: excellent, good, pass, and poor. At the same time, the different components of the lesson plan are subdivided. When the readiness of the components of the lesson plan is less than 0, the comprehensive assessment results are 82, 65, 43 and 16 respectively. When the readiness level of the components of the lesson plan is 0–15, the
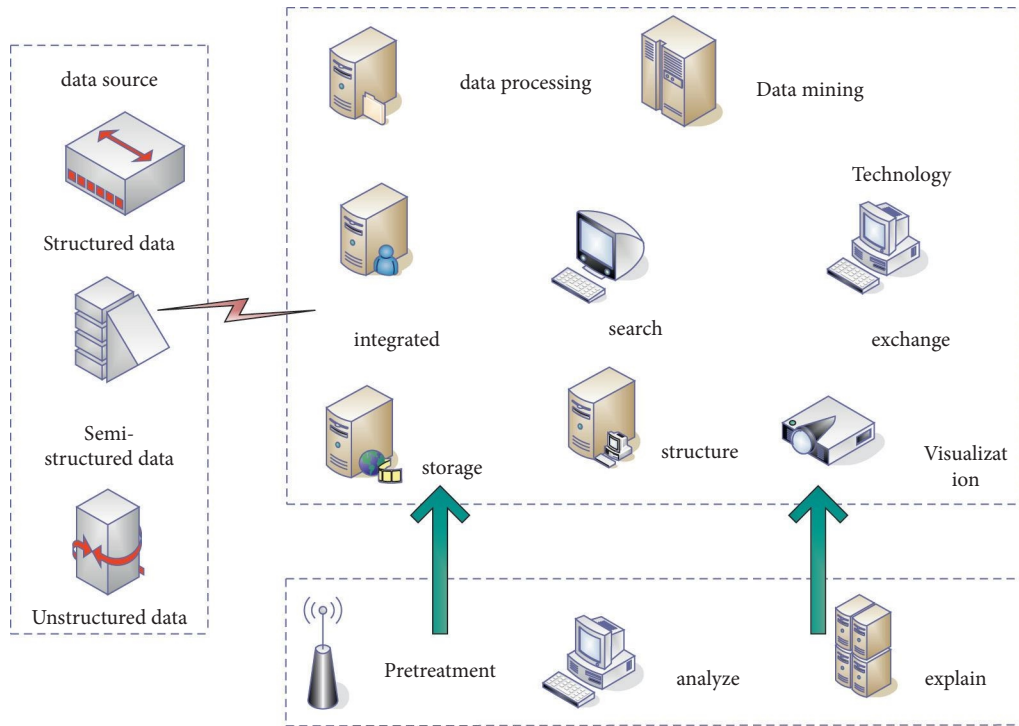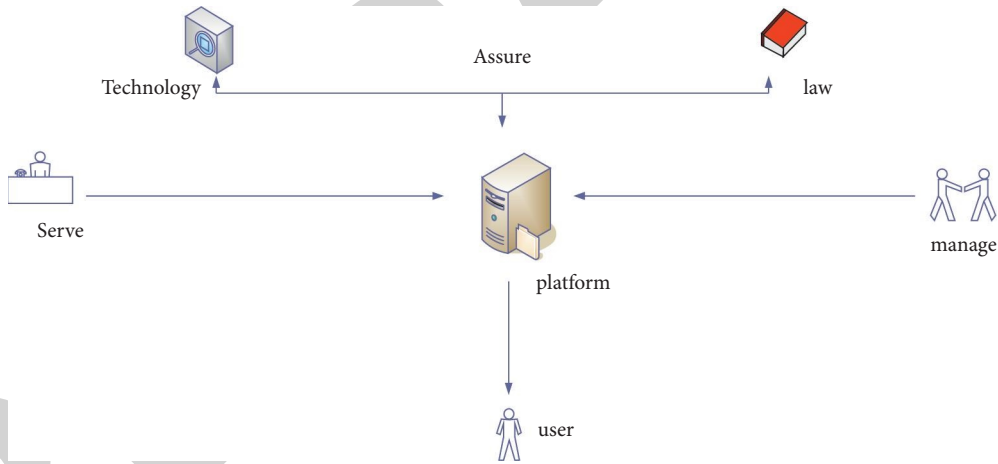
Figure 5: Data pre-processing structure.

Figure 6: Privacy security factors.

Table 1: Basic information of teachers in colleges and universities in A.

Title	Academic qualifications	Teaching experience	Rating score
Assistant professor	Master	4	67
Lecturer	Bachelors	12	69
Associate professor	PhD	29	88
Professor	Master	23	85

comprehensive assessment results are 87, 72, 52 and 27 respectively. When the preparation level of the components of the lesson plan is 15–30, the comprehensive assessment results are 91, 78, 63 and 42 respectively. When the preparation level of the components of the lesson plan is 30–60, the comprehensive assessment results are 93, 82, 67 and 55 respectively. When the preparation level of the components

of the lesson plan is greater than 60, the comprehensive assessment results are 95, 89, 78 and 65 respectively.

4.3. Attendance Assessment. In addition to students' attendance assessment, teachers' attendance is also an important part of the assessment. In order to explore the teachers in place A, we have analyzed the teachers' attendance. The details are as follows:

TABLE 2: Performance assessment weights of university teachers' positions.

Indicators	Weighting (%)	Indicators	Weighting (%)
		Ideological style	33
		Moral cultivation	39
Teacher ethics	35	Collaboration	15
		Public welfare activities	8
		Discipline	5
		First degree	32
Academic qualifications	35	Last degree	40
		Further education	28
		Foreign language level	30
Basic qualifications	30	Technical ability	30
		Dual teacher status	40

TABLE 3: Preparation of teachers' lesson plans.

Level of lesson plan preparation		Comprehensive assessment			
		Excellent	Good	Pass	Poor
	<0	82	65	43	16
	0–15	87	72	52	27
Ringgit improvement ratio	15–30	91	78	63	42
	30–60	93	82	67	55
	>60	95	89	78	65

TABLE 4: Attendance assessment.

Attendance		Comprehensive assessment of attendance			
		Excellent	Good	Pass	Poor
	>4	83	65	43	13
Absence frequency	2–4	92	73	53	42
	<2	99	86	67	58

According to the situation in Table 4, we classified the frequency of absenteeism when assessing teachers' absenteeism, and divided absenteeism into four categories: excellent, good, pass, and poor. At the same time, the frequency of absenteeism was subdivided. When the absences were more than 4 times, the comprehensive assessments were 83, 65, 43 and 13 respectively. When there are 2–4 absences, the comprehensive assessment is 92, 73, 53 and 42 respectively. When the absences were less than 2 times, the comprehensive assessments were 99, 86, 67 and 58 respectively. According to this data, the higher the absenteeism frequency of teachers, the lower the comprehensive examination score.

5. Construction Scheme of Quantitative Assessment of College Teachers' Performance Based on Big Data Analysis

5.1. Current Situation of Teachers in Colleges and Universities. College teachers are an important part of the activities of colleges and universities. In order to evaluate the performance of college teachers, we need to analyze the basic situation of college teachers.
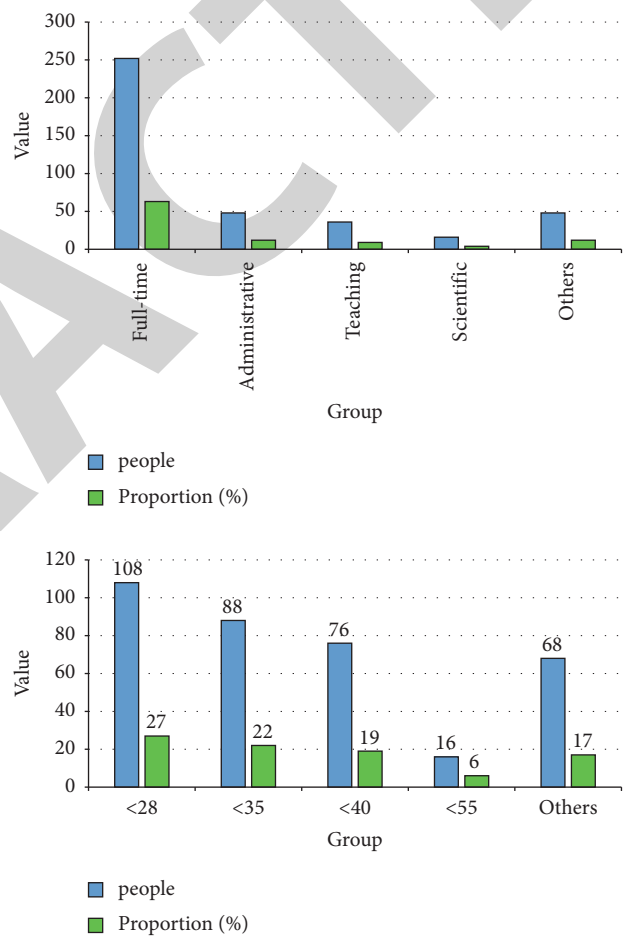

FIGURE 7: Basic situation analysis of university teachers.

According to the data in Figure 7, there are 252 full-time teachers in place A, accounting for 63%, and 48 administrative staff, accounting for 12%. There are 36 teaching assistants, accounting for 9%, 16 scientific researchers, accounting for 4%, and 48 other teaching staff, accounting for 12%. According to the data, there are many teaching staff in colleges and universities, of which the proportion of full-time teachers is the highest, and the proportion of scientific research personnel is the least. From this data, it can be seen that there are fewer scientific research talents and more faculty members in colleges and universities.
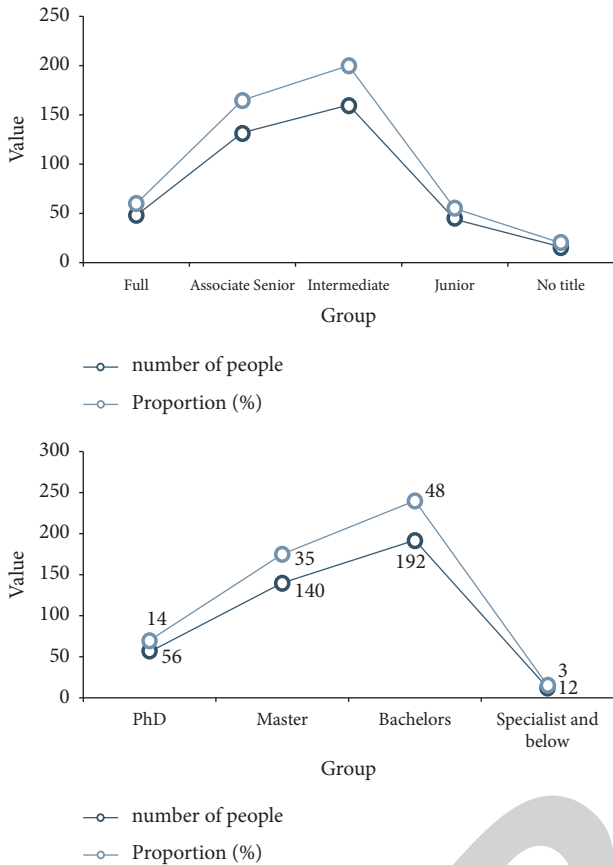
Figure 8: Distribution of university teachers' education.

Figure 9: Performance appraisal impact analysis.

Teachers in colleges and universities are an important part of educating students. In order to investigate the age of teachers, we divide them into categories such as less than 28 years old, less than 35 years old, less than 40 years old, less than 55 years old and others. According to the specific data, there are 108 teachers under the age of 28 in place A, accounting for 27%, and 88 teachers under the age of 35, accounting for 22%. There are 76 teachers younger than 40 years old, accounting for 19%, 16 teachers younger than 55 years old, accounting for 6%, and 68 teachers older than 55 years old, accounting for 17%. According to the data, with the continuous development of the teaching team, more and more young people have joined the teaching team, which will inject fresh blood into the entire teaching team.

According to the data in Figure 8, in order to understand the teaching status of college employees, we investigated the teachers' professional titles in place A. Among them, there are 48 senior teachers, 12% of instructors, 132 associate senior teachers (33% of instructors). There were 160 intermediate teachers, 40% of faculty, 44 junior teachers, 11% of faculty, and 16 teachers without a title, 4% of faculty. Based on the information, the proportion of intermediate teachers is the highest, and the number of senior and junior titles is less.

In addition to the survey of the professional titles of college teachers, we also surveyed the academic qualifications of teachers. Among them, 56 have doctoral degrees, 14% of faculty, 140 have a master's degree, 35% of faculty. 192 teachers have a bachelor's degree, 48% of faculty, and 12
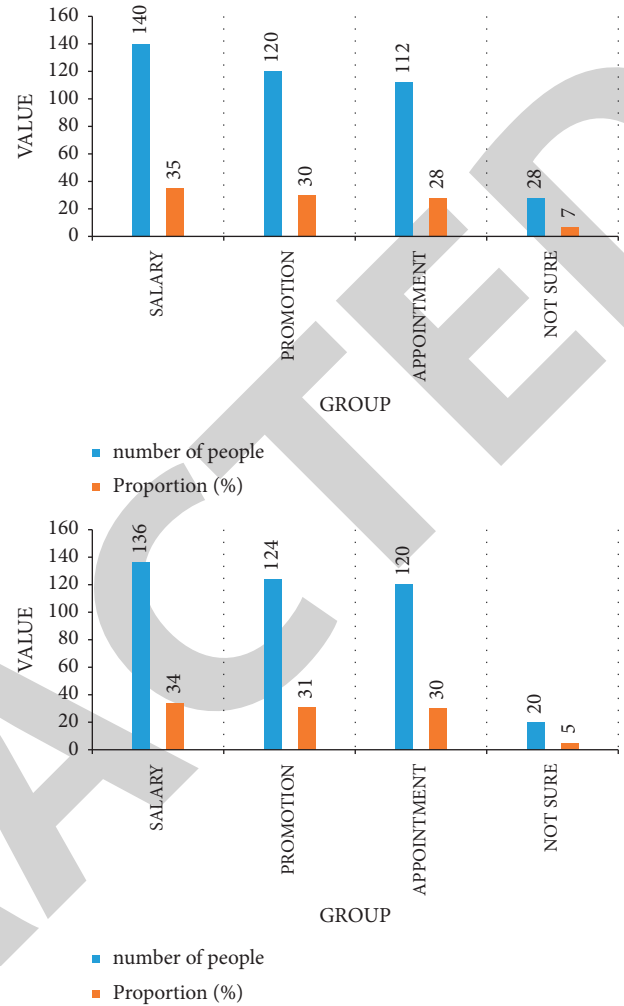
have a college degree or less, 3% of faculty members. The data shows that the highest percentage of teachers have a bachelor's degree, including more middle-aged teachers, which can promote the further study of in-service teachers. The proportion of teachers with a junior college or below is the lowest, indicating that college teachers have higher and higher requirements for academic qualifications, which also shows that the overall academic qualifications of the entire industry have generally increased.

5.2. Impact of Performance Appraisal. Performance appraisal can not only check the work situation of employees, but also motivate employees, but if performance appraisal is not scientific, it may also have the opposite effect.

According to the data in Figure 9, we have analyzed the assessments implemented in colleges and universities and conducted interviews with local teachers. Among them, 140 think that performance appraisal is related to salary, 35% of judges, 120 (30% of teachers) thought that performance appraisal was related to promotion. One hundred and twelve thought that performance appraisal was related to employment, 28% of instructors, and 28 were unclear about the
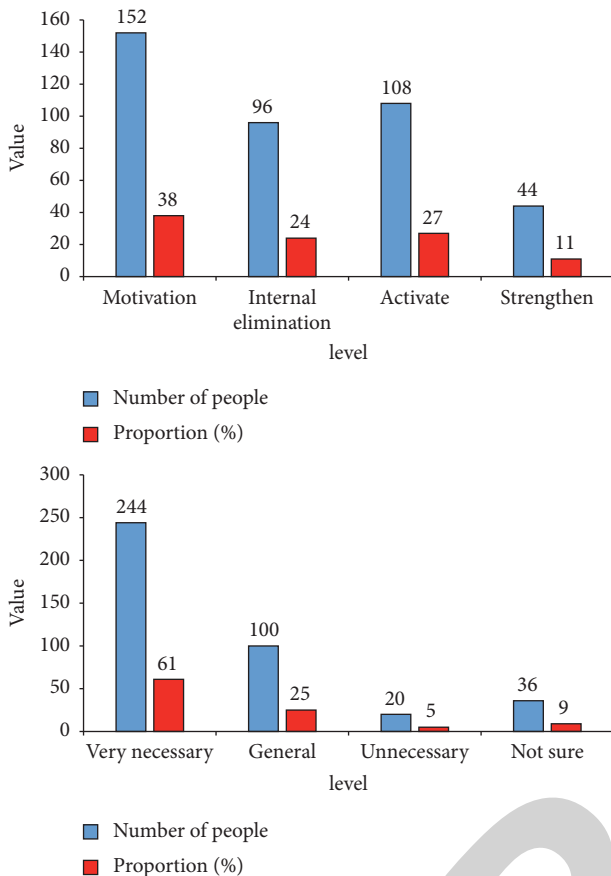
Figure 10: Analysis of the role of teacher performance appraisal.

factors influencing performance appraisal, 5% of instructors. The data show that in those universities where the appointment system for university teachers is in place, there is no focus on linking the results of performance appraisals to the appointment of teachers, which is an appointment system that does not live up to its name. However, according to survey research, not all performance appraisals have a clear purpose.

In addition to the influencing factors of performance appraisal, we also investigated which factors are related to teachers' expectation of performance appraisal results. According to the survey data, 136 teachers expect the assessment results to be related to their salary, 34% of instructors, 124 instructors, or 31% of instructors, expected assessment results to be related to promotion. One hundred and twenty teachers, or 30% of instructors, expected assessment results to be related to appointment, and twenty teachers, or 5% of instructors, had no clear requirements for assessment or promotion. Based on the data, performance appraisal needs to combine the strategic positioning of different universities and the management of teachers to formulate a performance appraisal system that conforms to their own development.

5.3. The Role of Teacher Performance Appraisal. According to the data in Figure 10, in order to investigate the role of performance appraisal in colleges and universities, we surveyed

teachers in local colleges and universities. Among them, 152 people think that performance appraisal will mobilize the enthusiasm of teachers, accounting for 38%. There are 96 people believe that performance appraisal will introduce external competition, lead to internal elimination, and improve the local teaching level of teachers, accounting for 24%. There are 108 people believe that performance appraisal will stimulate the personnel mechanism in colleges and universities, accounting for 27%, and 44 people think that performance appraisal can better complete supervision and management, accounting for 11%. According to the data, in the whole performance effect, mobilizing teachers' enthusiasm accounts for the highest proportion, indicating that the motivational effect of performance analysis is very obvious.

According to the current performance appraisal situation, 244 people believe that the current appraisal system needs to be rectified, accounting for 61%. There are 100 people think that the current assessment system is very general, accounting for 25%. There are 20 people think that the current appraisal system does not need to be rectified, accounting for 5%, and 36 people have no opinion on the current performance appraisal system, accounting for 9%. According to the data, most employees in colleges and universities believe that the current performance appraisal system needs to be rectified.

6. Conclusions

The problem of cultivating engineering talents in the 21st century is a key issue in the industrial development and international competition of various countries. With the development of the socialist economy with Chinese characteristics, the current society pays more and more attention to the quality of education, and teachers, as an important part of colleges and universities, are of great significance to the education of students. This paper aims to study the construction scheme of quantitative assessment of college teachers' performance based on big data analysis, and use big data analysis methods to make more scientific and reasonable performance assessment methods. Although this paper explores the performance appraisal of college teachers, there are still some shortcomings: (1) Colleges and universities are in the process of continuous development and improvement, and talent management should also be constantly transformed, which is not mentioned in this part of the article. (2) How to improve teachers' own moral construction and make moral construction and system construction develop together is difficult in practice.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

Acknowledgments

References

[1] T. N. Abell and H. Sevian, "Analyzing chemistry teachers' formative assessment practices using formative assessment portfolio chapters," *Journal of Chemical Education*, vol. 97, no. 12, pp. 4255–4267, 2020.

[2] A. G. L. Schafer and E. J. Yezierski, "Investigating how assessment design guides high school chemistry teachers' interpretation of student responses to a planned, formative assessment," *Journal of Chemical Education*, vol. 98, no. 4, pp. 1099–1111, 2021.

[3] S.-y. Deng and X. Que, "Research on the teaching assessment of students of science and engineering teachers in a university," *Computer Applications in Engineering Education*, vol. 27, no. 1, pp. 5–12, 2019.

[4] L. Xu, C. Jiang, J. Wang, J. Yuan, and Y. Ren, "Information security in big data: privacy and data mining," *IEEE Access*, vol. 2, no. 2, pp. 1149–1176, 2017.

[5] W. Wu and M. Peng, "A data mining approach combining K -means clustering with bagging neural network for short-term wind power forecasting," *IEEE Internet of Things Journal*, vol. 4, no. 4, pp. 979–986, 2017.

[6] J. Li and H. Liu, "Challenges of feature selection for big data analytics," *IEEE Intelligent Systems*, vol. 32, no. 2, pp. 9–15, 2017.

[7] Z. Lv, H. Song, P. Basanta-Val, A. Steed, and M. Jo, "Next-generation big data analytics: state of the art, challenges, and future research topics," *IEEE Transactions on Industrial Informatics*, vol. 13, no. 4, pp. 1891–1899, 2017.

[8] F. Marozzo, D. Talia, and P. Trunfio, "A workflow management system for scalable data mining on clouds," *IEEE Transactions on Services Computing*, vol. 11, no. 3, pp. 480–492, 2018.

[9] M. Parvizimosaed, F. Farmani, H. Monsef, and A. Rahimi-Kian, "A multi-stage Smart Energy Management System under multiple uncertainties: a data mining approach," *Renewable Energy*, vol. 102, no. PT, pp. 178–189, 2017.

[10] S. Rowan, E. J. Newness, S. Tetradis, J. L. Prasad, C.-C. Ko, and A. Sanchez, "Should student evaluation of teaching play a significant role in the formal assessment of dental faculty? Two viewpoints," *Journal of Dental Education*, vol. 81, no. 11, pp. 1362–1372, 2017.

[11] N. Carneiro, G. Figueira, and M. Costa, "A data mining based system for credit-card fraud detection in e-tail," *Decision Support Systems*, vol. 95, no. MAR, pp. 91–101, 2017.

[12] P. Y. Lin and Y. C. Lin, "Understanding how teachers practise inclusive classroom assessment," *Studies In Educational Evaluation*, vol. 63, no. 4, pp. 113–121, 2019.

[13] J. Harding, "A productive math struggle: questions and assessment," *Colorado Mathematics Teacher*, vol. 52, no. 1, p. 3, 2019.

[14] R. C. E. Dias, P. Valderrama, P. H. Março, M. B. dos Santos Scholz, M. Edelmann, and C. Yeretzian, "Quantitative assessment of specific defects in roasted ground coffee via infrared-photoacoustic spectroscopy," *Food Chemistry*, vol. 255, no. JUL.30, pp. 132–138, 2018.

[15] X. Islami, E. Mulolli, and N. Mustafa, "Using Management by Objectives as a performance appraisal tool for employee satisfaction," *Future Business Journal*, vol. 4, no. 1, pp. 94–108, 2018.

[16] T. Ibaraki, "The power of upper and lower bounding functions in branch-and-bound algorithms," *Journal of the Operations Research Society of Japan*, vol. 25, no. 3, pp. 292–321, 2017.

[17] A. Ansar, R. Rizvi, A. Hussain, A. Nawaz, A. Zafar, and A. Fayyaz, "Self and peer assessment of teachers' attitude towards teaching," *Journal of the College of Physicians and Surgeons Pakistan*, vol. 29, no. 4, pp. 365–370, 2019.

[18] A. Tds, B. San, and C. Cmg, "Grit in pharmacy faculty: a pilot analysis focused on productivity measures," *Currents in Pharmacy Teaching and Learning*, vol. 11, no. 10, pp. 1029–1034, 2019.

[19] M. E. Jarchow, P. Formisano, S. Nordyke, and M. Sayre, "Measuring longitudinal student performance on student learning outcomes in sustainability education," *International Journal of Sustainability in Higher Education*, vol. 19, no. 3, pp. 547–565, 2018.