



## Research Article

# Performance Appraisal and Automatic Scoring System for College Counselors Based on Kmeans Clustering

Zhichao Wang <sup>1,2</sup> and Qing Tian <sup>1,3</sup>

<sup>1</sup>School of Public Policy & Management, China University of Mining & Technology, Xuzhou, Jiangsu 221116, China

<sup>2</sup>School of Sports and Health Engineering, Hebei University of Engineering, Handan, Hebei 056038, China

<sup>3</sup>Handan University, Handan, Hebei 056005, China

Correspondence should be addressed to Qing Tian; [tianqing@hebeu.edu.cn](mailto:tianqing@hebeu.edu.cn)

Received 25 July 2022; Revised 29 August 2022; Accepted 2 September 2022; Published 20 September 2022

Academic Editor: Gengxin Sun

Copyright © 2022 Zhichao Wang and Qing Tian. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The optimal solution is output as the result to the Kmeans algorithm as the initial clustering center, and the proposed linear distance model is used to complete the clustering. Combined with the theory of target management, focusing on the job requirements and responsibilities of the counselors, the counselors' performance appraisal objectives were determined, the counselor performance appraisal system was established, and the first-level indicators and the second-level indicators and their weights were determined by using Del Illegal and Analytic Hierarchy Process (AHP). This paper constructs a performance appraisal system for local undergraduate college counselors based on management by objectives, and has carried out a pilot implementation in a college. The behavior anchoring method is used to determine the scoring standards of each index, which solves the problem of inconsistent scoring standards for different assessment subjects in the past. In the assessment results, the assessment results of the three dimensions are independently evaluated by category. This paper has a certain practical significance and reference value for the optimization research of the counselor's performance appraisal scheme under the background of institutional reform in a university.

## 1. Introduction

With the deepening of the reform of higher education and the expansion of the enrollment scale of colleges and universities, today's higher education has shifted from "elite education" to "popular education" [1, 2]. To put the ideological and political education of college students in an important position in the work of the party and the government, it is necessary to increase the investment in the ideological and political education of college students, and constantly improve the conditions and optimize the means [3]. "The ideological and political education work of college students should be taken as an important indicator for the evaluation and assessment of the quality and level of colleges and universities, and incorporated into the party building and education and teaching evaluation system of colleges and universities." It is an important part of the daily life

management of college students. It has the dual identities of teachers and cadres, and is one of the indispensable and important forces to ensure the healthy and smooth development of college education [4].

Since college counselors are responsible for the ideological guidance, affairs management, development design, and talent navigation of college students who are not deeply involved in the world, the quality of the counselor team has an important impact on college students [5]. The work assessment of counselors is an important means to clarify the role positioning, job positioning, job responsibilities, and quality requirements of counselors, and is an important guarantee for the realization of the "political strength, professionalism, strict discipline, and positive work style" of the counselor team. It is of great significance to fully implement the party's educational policy and implement the various tasks of ideological and political education for

college students [6]. Playing their role and correctly evaluating their work has become an important problem to be solved in the construction of the counselor team. Therefore, it is necessary to combine the characteristics and actual conditions of the work of college counselors under the new situation, and improve and perfect the content of the assessment in order to develop their potential more effectively and make the performance assessment play its due role [7, 8]. It has more realistic and long-term guiding significance for the continuous improvement of the level of the counselor team to meet the needs of the development of the new situation.

Bilateral filtering is used to perform edge-preserving and denoising preprocessing on the target, and the mixed model is used to improve the Kmeans algorithm. The global optimal solution is obtained by comparing and replacing the overall optimal solution generated by the particle swarm optimization algorithm in each iteration. According to the design idea of the performance appraisal system for college counselors based on goal management, combined with the current situation and existing problems of the performance appraisal of a college counselor, we try to build a college counselor performance appraisal system, aiming to improve the work efficiency and work of a college counselor and the enthusiasm to promote the healthy development of the counselor team. This paper analyzes the existing counselor's performance appraisal scheme in a university by using the incentive theory, points out the problems existing in the performance appraisal scheme, and believes that the improvement of the counselor's performance appraisal work is related to the position of the counselor's own job responsibilities, the school's organizational structure, and the performance appraisal system. In the design of the counselor's performance appraisal plan, "effectiveness," "implicit and ideological and political work," and "teacher morality" are used as the three assessment dimensions of performance appraisal, and the behavior anchoring method determines the indicators to be assessed, the weights of the indicators, and the evaluation criteria of the indicators, in order to realize the scientific evaluation of the counselors.

## 2. Related Work

The research on the performance appraisal of college counselors is an academic research topic that has received more and more attention [9]. In recent years, the focus of researchers' attention is how to improve the effective methods and means for the assessment of college counselors. Many assessment systems have been proposed, and the relevant papers are very rich [10]. Some schools have also formulated an assessment system for college counselors, clarifying the purpose and tasks of the assessment and evaluation of counselors, which have laid the foundation for colleges and universities to carry out assessment work [11].

Relevant scholars take ABC University as the research object, through the research and analysis of the current situation of its counselor team and the existing performance

evaluation system, using KPI theory, AHP, and fuzzy mathematics comprehensive evaluation theory to establish a new set of counselors [12]. On this basis, the performance evaluation system of individual counselors is established, and further measures to encourage the team of counselors are proposed.

The researchers made a diagnosis of the school's existing counselor performance system, and pointed out the problems prevalent in the existing assessment system; in response to the existing problems, by improving the existing assessment system, a set of performance assessment index systems suitable for Nanchang University's counselors was designed [13]. In the design of the student evaluation counselor model, the fuzzy comprehensive evaluation method is adopted, and the performance evaluation result feedback mechanism is established to strengthen the incentive. Relevant scholars have introduced the current performance evaluation system of CM University counselors in detail, and analyzed the main problems and reasons [14].

After careful review and discussion, a scientific development example of counselor evaluation system has been initially constructed from the aspects of evaluation system, evaluation criteria, acquisition, and processing of evaluation information, which is the basis for building the counselor evaluation mechanism [15–17]. An innovative idea is given. Combined with work practice, the researchers applied the AHP to the assessment of the counselors for further exploration and research [18].

Relevant scholars have analyzed the unclear purpose, unreasonable methods, and lack of validity of the performance assessment of college counselors in domestic colleges and universities, and put forward specific ways to strengthen the performance assessment of college counselors [19, 20]. Relevant scholars pointed out that currently, various assessment methods are generally used in the work assessment of counselors, but there are also problems such as ambiguous assessment positioning and unclear assessment content indicators [21–23]. Therefore, the main methods of the work assessment of counselors are proposed, namely, grade assessment method, group assessment method, 360-degree assessment method, sequence comparison method, and relative comparison method, and countermeasures are put forth to improve the work assessment system of counselors, improve the content indicators of the work assessment system, effectively utilize the purpose and results of work assessment, improve the procedures of the work assessment system, and construct a bionic assessment system for college counselors [24, 25].

## 3. Methods

*3.1. Improved Kmeans Clustering Algorithm.* This paper randomly initializes the velocity and position of each particle in the population within the search space and velocity interval. Then, the calculation formula of the fitness function is determined according to solving the optimization problem. We calculate the optimal solution found by each particle as its individual extremum, and obtain the global optimal solution of this iteration of the population by comparing

these individual extremums. It is updated by comparison with the obtained global optimal solution of the population history, and then the velocity and position of each particle are updated.

On the basis of using the dynamic particle swarm optimization Kmeans clustering algorithm to select the initial cluster center, the velocity update calculation formula of the  $j$ th dimension of the particle  $i$  at the  $k$ th iteration and the position update calculation formula of the  $j$ th dimension of the particle  $i$  at the  $k$ th iteration are, respectively,

$$v_{ij}^k = \frac{v_{ij}^{k+1}}{w} - \frac{c_1 r_1 (gbest_i - x_{ij}^k)}{c_2 r_2 (pbest_j - x_{ij}^k)} v_{ij}^{k+1}, \quad (1)$$

$$x_{ij}^k + x_{ij}^{k-1} = 2v_{ij}^{k+1} x_{ij}^k.$$

Among them,  $w$  is the inertia coefficient;  $c_1$  and  $c_2$  are acceleration constants, also known as learning factors, which represent the self-learning ability and collective learning ability of each particle, respectively, and the value range is  $[0, 4]$ ; finally, it is judged whether the termination condition is reached. The termination condition can be set to the maximum number of iterations. If the termination condition is satisfied, then the iteration ends, and the particle swarm optimization solution process is completed. Otherwise, continue to calculate the current fitness value of each particle, update the individual extreme value and the global optimal solution, and update the speed and position of the particle until the iteration termination conditions are met.

For the standard particle swarm optimization algorithm, the value of the inertia coefficient  $w$  in the velocity update formula and position update formula of each particle in the population is usually a predetermined constant, and the value remains unchanged during the iteration process. Therefore, for the standard particle swarm optimization algorithm, there is a disadvantage that the iterative optimization process is easy to fall into the wandering of the local optimal solution, which leads to missing the global optimal solution. An effective way to make up for this deficiency is to adjust the value of the inertia coefficient  $w$  from remaining unchanged during each iteration to a value different from the previous iteration for each iteration. The particle swarm optimization algorithm in the clustering algorithm model DPSO-LK based on particle swarm and improved Kmeans clustering proposed in this section will improve the particle swarm by dynamically adjusting the inertia coefficient so that the inertia coefficient  $w$  of each iteration obeys a probability distribution. The formula is its probability density function:

$$f| (x) = \left( \frac{\sqrt{5}}{6\pi} - \frac{1}{\sqrt{6\pi}} \right) \exp(1 - 6\sqrt{x - 5}). \quad (2)$$

The fitness of the particle is represented by  $f_i$ , and the calculation formula of  $f_i$  is the calculation formula of the distance from the data point to the cluster center of the improved Kmeans clustering algorithm:

$$f_i = \frac{1}{D_i} = \prod_{i=1}^n x_i - \prod_{k=1}^m |1 - c_k| + \sum_{i=1}^n \sum_{k=1}^m \max(x_n c_m). \quad (3)$$

When the fitness of the particles almost no longer changes, it means that the particle swarm optimization has reached convergence. In this paper, the variance is used to represent the fitness change. When it is less than a certain value, it is considered that the algorithm has found the global optimal solution.

$$\delta^2 = \frac{1}{n^2} \prod_{i=1}^n \sqrt{|f_i - f_{avg}|}, \quad (4)$$

$$f_{avg} = n \prod_{i=1}^n \sqrt{|1 - f_i|}.$$

When the dynamic particle swarm optimization algorithm converges, the obtained global optimal solution is used to initialize the cluster center of the Kmeans algorithm, which reduces to a certain extent the unstable final effect caused by the random selection of the initial cluster center by the traditional Kmeans algorithm. Finally, multiple iterations are performed through the improved Kmeans algorithm until convergence.

This section uses a hybrid model GAPSO of genetic algorithm and dynamic particle swarm algorithm to solve. The model finds the overall optimal solution by comparing the optimal solutions of the corresponding populations of each generation of genetic algorithm and particle swarm optimization.

If the fitness of the optimal solution of the particle swarm optimization algorithm is higher than the optimal solution, it will be regarded as the overall optimal solution and assigned to a random chromosome; otherwise, the chromosome with the highest fitness will be assigned. As the overall optimal solution, it is assigned to a random particle in the particle swarm algorithm, and then the particle swarm algorithm adjusts the relevant parameters, and the algorithm performs crossover mutation until the iteration is terminated. The model framework is shown in Figure 1.

The specific optimization steps of the GAPSO model integrating genetic algorithm and particle swarm optimization algorithm are as follows:

- ① Initialize the genetic algorithm population, encode the data points in binary, convert them into chromosomes, set the corresponding parameters, and initialize the particle velocity in the population.
- ② Two algorithm population individuals perform the fitness calculation. The particle swarm algorithm population updates the individual extreme value and the population extreme value, and the genetic algorithm population selects the optimal solution of the population through group optimization.
- ③ According to the comparison of the corresponding population optimal solutions of the two algorithms, the overall optimal solution is generated. If the iteration termination condition is satisfied, the

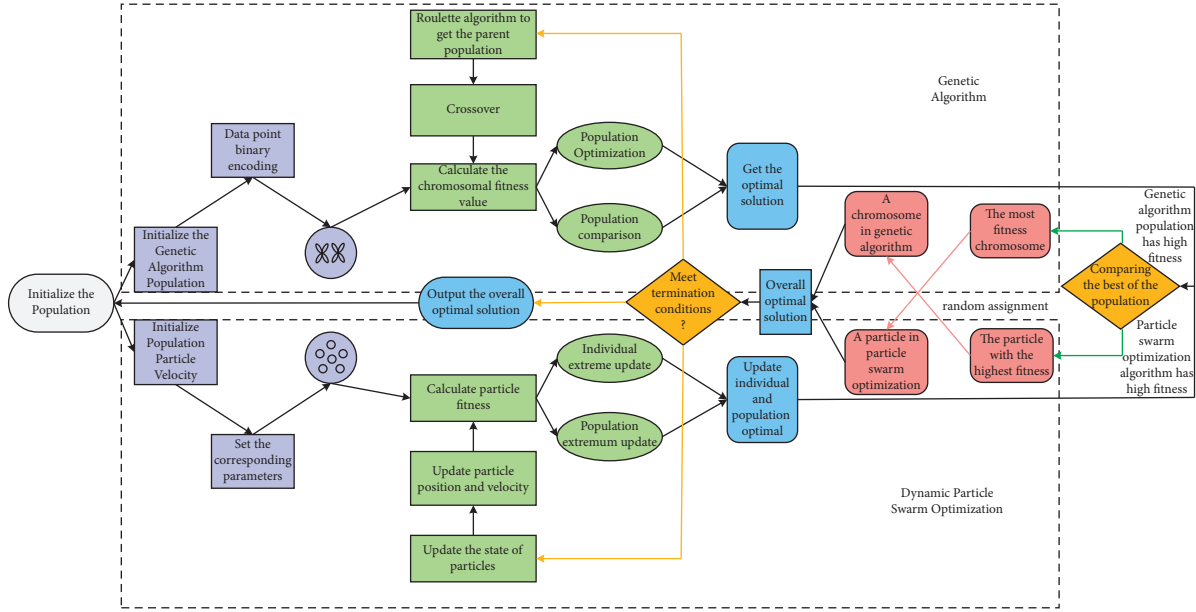


FIGURE 1: Model framework.

iteration loop is ended and the overall optimal solution is output; otherwise, proceed to the next step.

- ④ If the fitness of the population optimal solution of the particle swarm optimization algorithm is higher than that of the genetic algorithm, it is randomly assigned to a chromosome in the genetic algorithm; otherwise, the chromosome with the highest fitness in the genetic algorithm is randomly assigned.
- ⑤ The particle swarm population dynamically adjusts the particle speed and position, and the genetic algorithm population roulette selection method selects to generate the parent population.
- ⑥ Genetic algorithm population performs crossover mutation operation.
- ⑦ The two populations of particle swarm and genetic algorithm carry out a new round of iteration, and continue to find the optimal solution of the population.

The traditional Kmeans clustering algorithm uses Euclidean distance as a similarity criterion to cluster sample data points. For two data points  $x$  and  $y$  in  $n$ -dimensional space, the Euclidean distance is calculated as follows:

$$L_o(x, y) = \sqrt{|y_i - x_i| \sum_{i=1}^n \left(1 - \frac{x_i}{y_i}\right)^2}. \quad (5)$$

The Manhattan distance is calculated as follows:

$$L_m(x, y) = \sqrt{|x_i - y_i| \sum_{i=1}^n \left(\frac{y_i - x_i}{y_i}\right)^2}. \quad (6)$$

The formula for calculating the Chebyshev distance is as follows:

$$L_q(x, y) = (x_1 - y_1) \sum_{i=1}^n \max(x_n, y_n). \quad (7)$$

It can be seen from the three distance calculation formulas that for the data points in the same  $n$ -dimensional data set, on the basis of the same number of subtraction operations, the Chebyshev distance calculation only needs to be compared, and the Manhattan distance calculation only needs to be repeated. The summation operation, and the calculation of the Euclidean distance, also requires the square sum operation and the square root operation, which takes more time than the first two distances.

Euclidean distance does not reflect the difference between two data points in  $n$ -dimensional space for distance measurement in great detail. Therefore, the linear combination of Manhattan distance and Chebyshev distance is used instead of Euclidean distance as the similarity criterion to calculate the distance from the sample data point to the cluster center to realize clustering. The linear distance model of Manhattan distance and Chebyshev distance can save clustering time to a certain extent because it avoids square operation and square root operation in distance calculation.

The Euclidean distance used in this paper to calculate the distance of the cluster center is only to synthesize the distance between two points in various dimensions, which weakens the differences in each dimension, which will cause some essential features to be ignored.

The linear distance model of Manhattan distance and Chebyshev distance is applied to calculate the distance between pixels, which not only measures the similarity between two pixels from various dimensions but also preserves which dimension the two pixels are in. The difference is the largest, and the distance is how much information. Therefore, the linear distance model of Manhattan distance

and Chebyshev distance can achieve the effect of retaining essential features to a certain extent.

The effect of applying Kmeans directly is not ideal. In this section, the Kmeans clustering algorithm is analyzed and improved by changing the calculation method of the distance from the data point to the cluster center. The new distance calculation method is the linear distance model proposed in the first section of this paper. The specific calculation formula is

$$D_i = \frac{1}{\prod_{i=1}^n x_i - \prod_{j=1}^k |1 - c_j| + \sum_{i=1}^n \sum_{j=1}^k \max(x_n, c_k)}. \quad (8)$$

Aiming at the defect that the segmentation result of Kmeans clustering algorithm is very dependent on the selection of initial cluster centers, this section proposes an improved Kmeans clustering algorithm based on dynamic particle swarm optimization combined with mixture model. The dynamic particle swarm optimization algorithm is used to find the optimal solution through iteration. The two algorithms of each generation are compared with their respective optimal solutions to find the overall optimal solution, which is then output to the Kmeans algorithm as the initial clustering.

**3.2. Determination of Performance Goals for College Counselors.** This paper takes a college counselor as an example, and fully considers the overall goal of a college, the goal of the student work office, and the actual situation of the counselor's job when setting the counselor's performance goals. According to the levels of the organizational structure, they are connected in series to form an interlocking performance target system. The content determination and setting procedures of a university performance target are as follows:

First, determine the overall goals of the school. The setting of the counselor's performance goals should start with the school's goals, and after the school's goals are determined. In order to achieve the overall goals of the school, each department sets the "departmental goals" and "personal goals" for each department.

Second, set departmental goals. The Student Affairs Office formulates departmental goals based on the overall goals set by the school.

Finally, set counselor job goals. Due to the particularity of the work of counselors, the work requirements and positions of counselors in the "Professional Competency Standards for Counselors in Colleges and Universities (Interim)" and "Regulations on the Construction of Counselor Teams in Ordinary Colleges and Universities" should also be considered when setting the counselor's performance goals.

The overall goals of the school and the departmental goals of the Student Work Office have been determined. When formulating the performance goals of the counselors, according to the school's overall goals and the departmental goals of the Student Work Office, combined with the "Professional Competency Standards for

Counselors in Colleges and Universities (Provisional)," the work requirements and job responsibilities of counselors, as well as the current status of the work of a college counselor and the conditions for job employment, have been analyzed and studied in depth with the "Regulations on the Construction of Counselor Teams in Ordinary Colleges and Universities," and the job objectives of counselors have been preliminarily determined. Through open interviews with the expert group, the post goal of a college counselor was finally determined, as shown in Figure 2.

### 3.3. Decomposition of College Counselor Performance Goals.

The development of students includes the cultivation of students' learning ability, behavior development, national identity, social responsibility, etc. A college counselor should strive to become a guide on the way of students' development and growth, including guiding students' development through online ideological and political education.

A college counselor must adhere to "student-oriented, service and education," improve services, take students as the main body, serve students' development and success, and do a good job in counseling students' mental health, identifying and assisting students from financially disadvantaged families, and finding employment.

The daily work management of a college counselor mainly includes the evaluation of students' awards, the construction of party branches and class groups, daily study management, dormitory management, study style construction, and crisis event handling.

The construction of a college counselor team requires improving the quality of personal professional work and developing towards specialization and professionalism. The career development of counselors is related to the stable and healthy development of the counselor team construction. Therefore, counselors should properly consider personal career development, continuing education and training, obtaining professional certificates, making career development plans, and promotion of positions and titles.

Work performance is one of the criteria for measuring the work ability of a college counselor, including the pass rate of students in grades 4 and 6, the employment rate of students, the rate of postgraduate entrance examinations, the rate of award-winning classes and students, the award-winning situation of guiding students in competition, etc., as well as personal participation in competitions.

### 3.4. Implementation of Performance Goals for College Counselors.

After a college counselor's performance assessment target is determined, combined with the actual work requirements of the counselor, the assessment passes the opinions and suggestions of experts, and the following assessment target evaluation criteria are obtained, that is, the standard for the counselor to implement the performance target.

Many performance appraisal failures are caused by the wrong cognition of the evaluators themselves. Therefore,

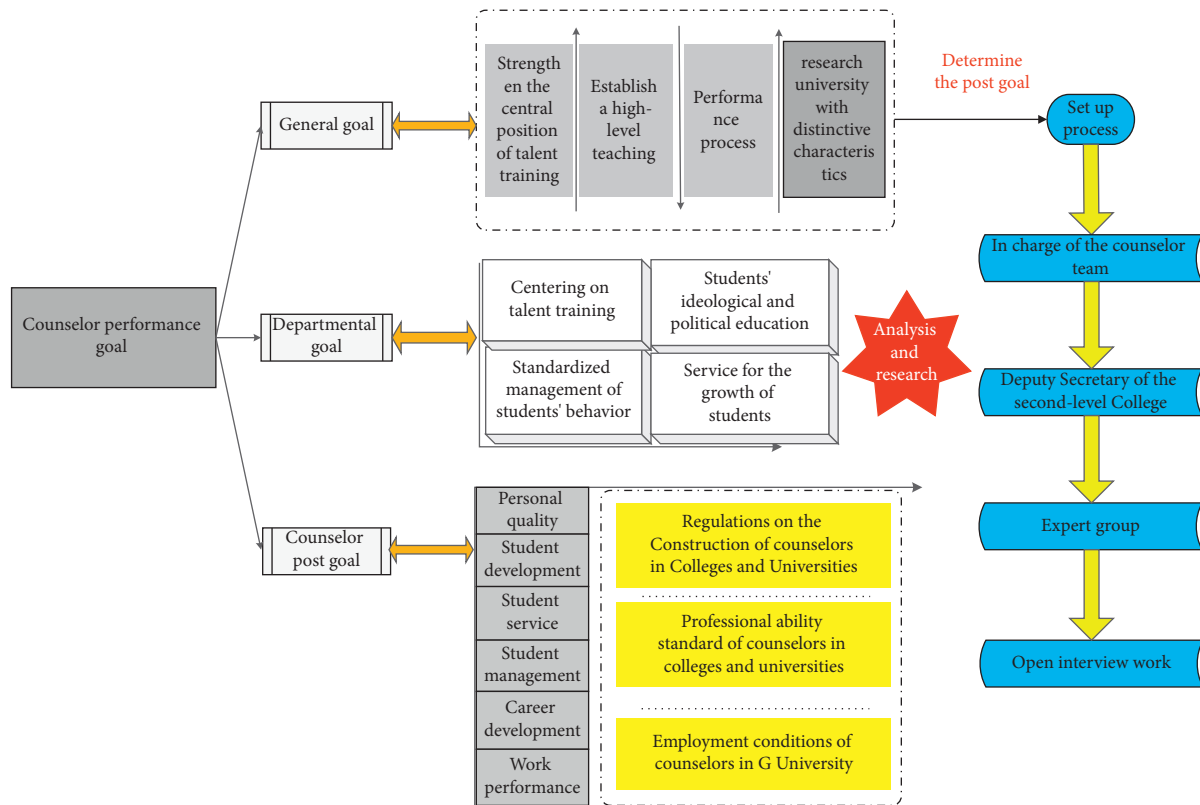


FIGURE 2: A college counselor's performance goal setting procedure.

before the appraisal, it is necessary to publicize and mobilize the appraisers to get rid of their misunderstandings. Through performance evaluation mobilization meetings, training courses, lecture reports, etc., all instructors involved in the evaluation can explain to all the staff. In colleges and universities, the work plan is usually formulated in the academic year. In order to facilitate the effective implementation of performance goals and tasks and make performance appraisal more in line with work requirements, it is more reasonable to take one academic year as the cycle of performance appraisal for a college counselor. The assessment time span is one academic year, and real-time monitoring needs to be done during the implementation process to avoid implementation interruption or data loss. In the process of implementing the performance goals, the Student Affairs Office of a university is responsible for monitoring the process of implementing the performance goals of the counselors.

**3.5. Assessment of College Counselors' Performance Targets.** Usually, the Student Affairs Office of the school takes the lead in organizing the performance appraisal of the counselors, undertakes the specific implementation, data analysis, file management, etc., and puts forward suggestions on the use of the appraisal results. After the implementation cycle of the performance target of a college counselor is over, it will face the specific practical link of the counselor's performance assessment, which includes the following steps:

- (1) The counselor to be assessed submits the corresponding assessment materials. For example, submit the work summary and provide supporting materials related to the assessment index system.
- (2) The school assessment team will review and evaluate the assessment materials provided by the counselors.
- (3) The leading department of assessment shall collect and summarize the assessment opinions submitted by various assessment subjects according to the assessment plan.
- (4) The lead department of the assessment shall conduct data statistics on the recovered evaluation scales, and calculate the assessment scores according to the weights of the corresponding indicators.

The performance evaluation of a college counselor is a problem that can be decomposed into a criterion layer around the overall goal, and determined as the final plan layer, and then the data are substituted into the calculation, and finally the result is obtained and fed back.

The analytic hierarchy process refers to the method of decomposing the elements that are always related to decision-making into goals, criteria, plans, etc., and then combining qualitative analysis and quantitative analysis, assigning weights to indicators, and then calculating the results.

Therefore, this paper adopts the AHP to determine the weight of the counselor's performance indicators, because this method overcomes the limitations of the empirical

judgment method and the expert determination method, that is, when there are different affiliations between the indicator layer and the sub-indicator layer. The problem of how to determine the weight can overcome the influence of the subjective factors of the evaluator to the greatest extent.

Analytic Hierarchy Process (AHP) forms a multi-objective and multi-level comparison model by decomposing complex problems according to the dominance relationship. The relative importance ranking is carried out through pairwise comparison, and finally the overall ranking of the relative importance of various factors is obtained to establish the weight of each factor.

*3.6. Feedback on the Performance Goals of College Counselors.* Leaders and coaches should be well prepared for feedback on performance results. If the result is unsatisfactory, both parties in the assessment need to fully communicate and discuss what problems exist in the assessment and how to solve them.

Through up-to-down communication and careful research, it is ensured that the performance target setting is more scientific and reasonable, the design of the indicator system is more effective, and the enthusiasm of the counselors to participate and the effect of the assessment implementation are improved. At the same time, the method of feedback should also be prepared. According to the different content of the feedback and the actual needs of the work, different methods such as written feedback and interview feedback should be adopted.

In addition, before the feedback, the feedback data should be carefully verified, and the expressions should also be carefully considered.

The purpose of the assessment is by no means just for the counselor's bonus distribution, evaluation of merit, etc. If this orientation is adhered to, the counselor will ignore the purpose of the assessment, so that he or she cannot fully grasp his or her own shortcomings and become resistant to the assessment. Feedback must adhere to the correct and clear direction, that is, to convey the school's strategic goals and work expectations for counselors, to promote performance improvement as the primary purpose, and to clearly advocate and implement it in practice.

In actual work, one of the important reasons for the failure of assessment is that the purpose of benefit distribution is not to improve performance, because the assessment system designed with benefit distribution as the starting point is not comprehensive, and it will inevitably lead to the realization of organizational goals. The effect is not obvious, and in actual operation, it is easy to cause the assessee to resist the assessment or to cheat for their own interests, causing difficulties in the assessment. Therefore, performance appraisal can only be based on performance improvement as the primary purpose and starting point. Doing a good job in the application of performance improvement results is to feed back the completion of performance goals to the relevant evaluated objects; help them analyze the reasons; provide them with training, consulting, coaching, and other assistance to improve performance;

promote performance improvement; and formulate the target of the next round of performance appraisal.

The appraisers provide frequent feedback, which plays the role of prompt reminder and supervision, which is conducive to better solving the problems existing in performance improvement, especially those problems that need to be accumulated and improved on a daily basis.

In addition, the evaluation subject often gives performance feedback to the counselor, so that before the completion of an evaluation cycle, they can have a preliminary understanding of the completion progress of their performance goals, and have a general psychological expectation for the evaluation results. The regularization and normalization of performance results feedback needs to be guaranteed by corresponding systems.

## 4. Results and Analysis

*4.1. The Weight of the "Business Effect" Indicator.* On the issue of the weight of indicators, this article consulted and interviewed 7 experts, namely, the chairman of the school, the secretary of the party committee, the dean, the deputy dean in charge, the director of the student department, the secretary of the Youth League Committee, and the director of the employment department. In the specific steps, the seven experts first built the judgment matrix of the four first level indicators, calculated the corresponding weight, and then respectively, built the matrix of the four second level indicators, calculated the weight, and finally integrated all the first level and second level indicators. After the first-level indicators are selected, the weights of all the second-level indicators are obtained.

In each data calculation, this paper uses the Yaahp software to analyze and calculate the data. Yaahp is an analytic hierarchy process auxiliary software, which is widely used to provide model construction, calculation, and analysis for the decision process of analytic hierarchy process. According to the weight of the first-level index and the weight of the first-level index corresponding to the second-level index, the total weight of the evaluation of the second-level index is finally obtained, as shown in Figure 3.

The dimension of "implicit and ideological and political work" has only one indicator, "counselor education management log," and the weight of a single indicator is 100%. In this article, the leaders of the school were interviewed about the weight of the five indicators in the dimension of "professionalism and morality," and they agreed that all indicators should be equal. According to this opinion, the five indicators of the "professional morality" dimension, namely, "patience," "fairness," "integrity," "responsibility," and "professional guidance ability" each account for 20% of the weight.

*4.2. Evaluation Method of "Effectiveness" Dimension Indicators.* There are both quantitative and qualitative indicators among the four categories of indicators, and the behavior anchoring method can be used to evaluate the assessment indicators. The formulation of the behavior



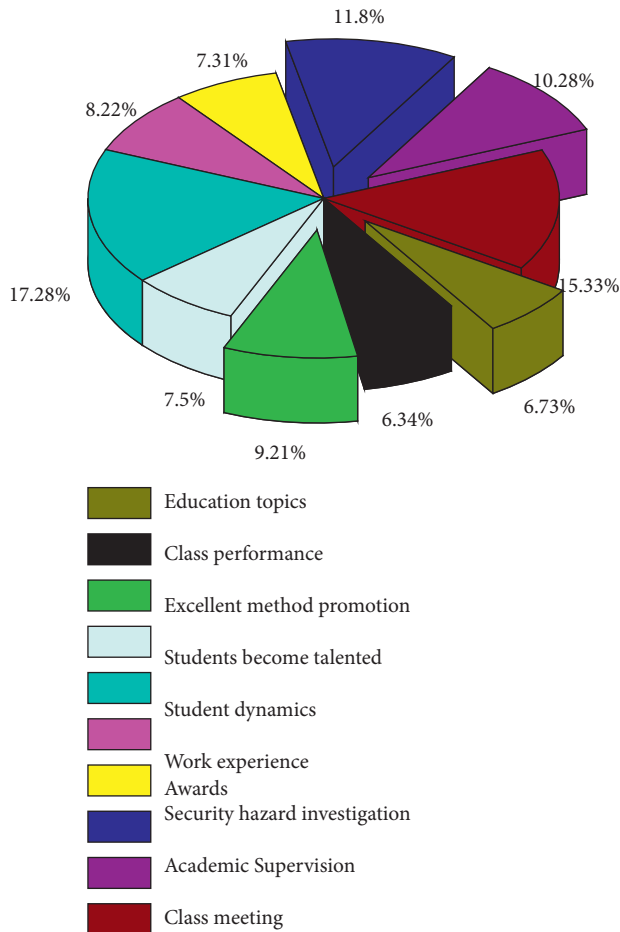


FIGURE 3: Weights of secondary indicators.

anchoring method first describes 5–9 typical behaviors that may occur in actual work, and then measures and scores different situations of these typical behaviors. Generally, the larger the score, the better the effect. On this basis, the anchoring is established. The score sheet is used as the basis for employee performance appraisal. According to the rules of the behavior anchoring method, combined with the measurement standards of a university, the evaluation levels of these four types of indicators are set from excellent to poor as five, four, three, two, and one. Time-based evaluation sets the corresponding grades and coefficients according to the five situations that the counselor completed the work within the specified time. In the executive evaluation, the corresponding grades and coefficients are set according to the five situations of the completion of the work of the counselor. The execution class evaluation criteria are shown in Figure 4.

The evaluation ranking type evaluation sets the corresponding grades and coefficients according to the five performances of job satisfaction. The evaluation ranking criteria are shown in Figure 5.

**4.3. Assessment Methods for the Dimension Indicators of “Implicit and Ideological and Political Work” and “Professional Ethics”.** The indicator of the dimension of “implicit and ideological and political work” is the “counselor

education management log.” Accordingly, the evaluation of this indicator can be decomposed into four evaluations: devotion to one’s work, work standardization and organization, service awareness, and work effectiveness. The evaluation results of teachers’ morality and style of students are shown in Figure 6.

**4.4. Assessment Cycle.** The original performance evaluation cycle of counselors was one cycle per academic year, and there was a monthly evaluation every month. In the study of the new program, this paper conducted interviews with the leaders of the school’s student management regarding the assessment cycle. After interviews, it was agreed that the work responsibilities and work procedures of counselors have changed a lot after the institutional reform. Changing the assessment cycle to one semester can reflect the actual work of counselors in a timely manner and help evaluate the effectiveness of the reform. According to the opinions of most people interviewed by experts, the assessment cycle of the new assessment plan is set to once a semester. The survey indicators of the counselor’s performance appraisal cycle are shown in Figure 7.

**4.5. Application of Assessment Results.** In this paper, the “effectiveness” dimension is set as the basic score of 100 points, the “implicit and ideological and political work” dimension is set as an additional score of 10 points, and the “teacher morality” dimension is set as a daily warning and a necessary condition for counselor salary promotion. According to the analysis of reinforcement theory, if a certain stimulus is beneficial to the examiner, the behavior will repeat; if it is unfavorable to the examiner, the behavior will weaken or disappear.

The assessment grade of 60–70 points is basically qualified, and its coefficient is 1.0; the assessment grade below 60 points is unqualified, and its coefficient is 0.6. The difference between a score of 59 and a score of 60 may have a difference of 0.4 in the assessment coefficient, which will allow the counselor to avoid the occurrence of this negative behavior as much as possible, thereby improving the assessment score.

In order to improve the professionalization of counselors, those who have established an assessment score of 85 for two consecutive semesters can submit an application for salary increase to the Personnel Office. The Personnel Office will review the counselor’s “professional morality” dimension, and those who pass can agree to increase the salary.

The category of “implicit and ideological and political work” is set as an additional score of 10 points (this indicator needs to be converted proportionally to the assessment scores). This additional point can be added directly to the score in the “Effective” category assessment, but there are two limitations.

The first limitation is that the total score after the addition is not higher than 100 points, and the second limitation is that the added score only affects the total score and does not change the original assessment coefficient.



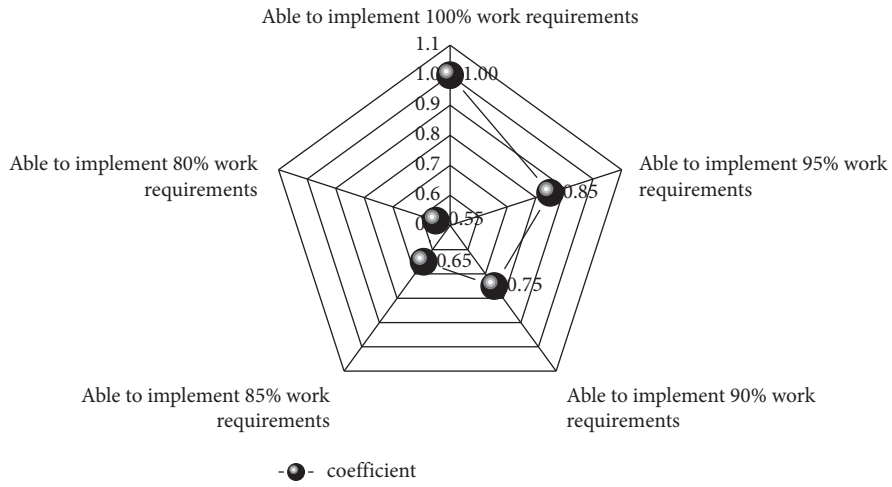


FIGURE 4: Execution class evaluation criteria.

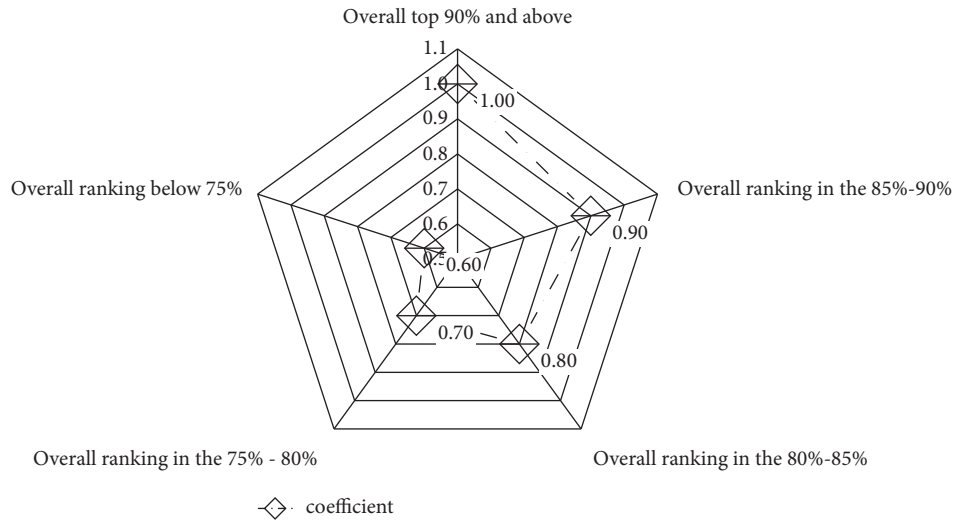


FIGURE 5: Evaluation ranking criteria.

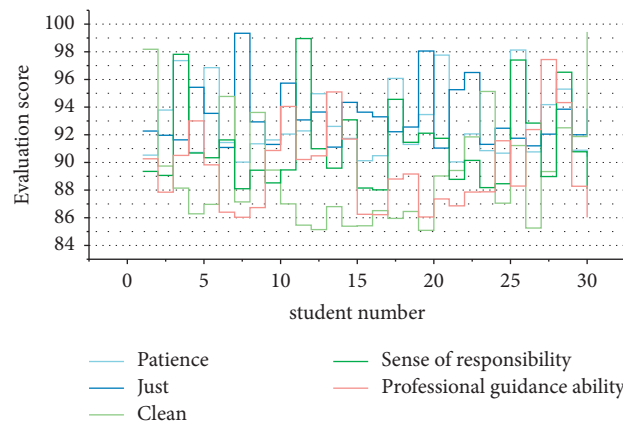


FIGURE 6: Student evaluation results of teacher morality and style.

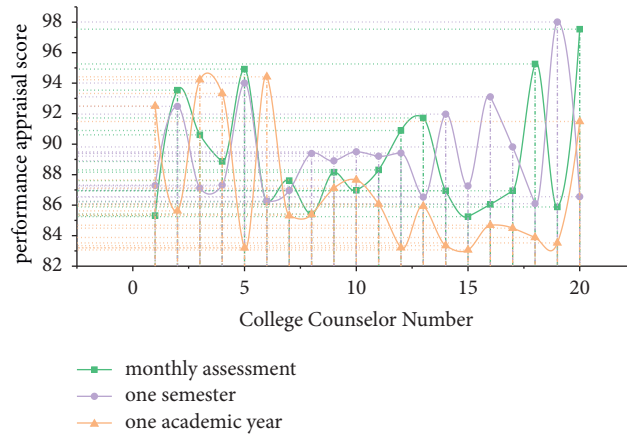


FIGURE 7: The survey indicators of the counselor’s performance appraisal cycle.

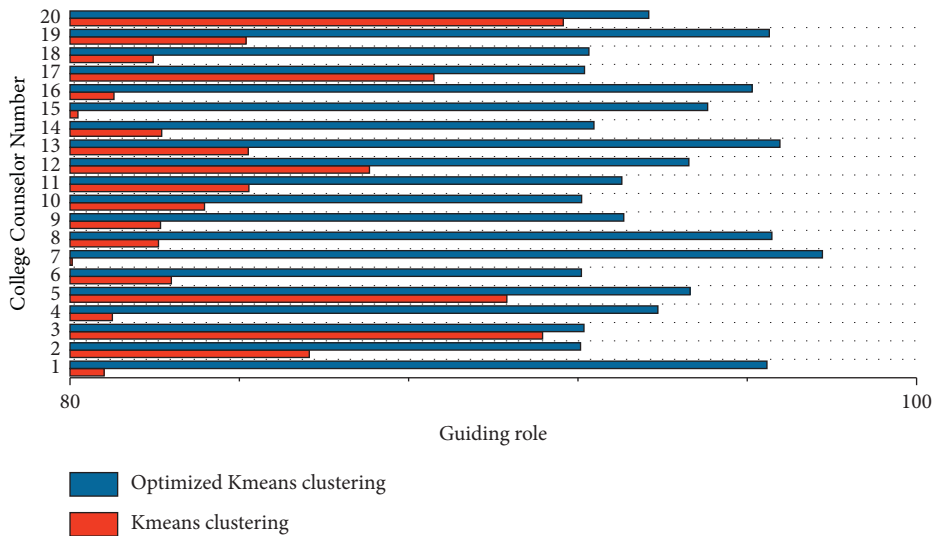


FIGURE 8: Guidance results of counselor assessment indicators.

This design only gives “honor” and not “money,” so that peer counselors can easily play in the evaluation without too much pressure.

Otherwise, peer counselors will have psychological scruples, which will affect the objectivity of evaluation. Although the additional points can affect the promotion, the basic score of the counselor must reach a certain value, and there is no fault in the teacher’s morality and style. In this way, whether you can be promoted or not, the evaluation of peer counselors actually has less impact.

The above application of the results of different assessment dimensions is designed after absorbing the existing problems and experience in the current assessment system. Such a design can not only give full play to the 360-degree assessment to meet the requirements of the counselor’s work performance but also meet the school’s institutional reform; after the counselor’s work has been “slim down,” it will focus on the development of morality and talent cultivation.

In the performance evaluation of the former counselors in a certain university, there are some shortcomings such as the failure of the evaluation indicators to play a guiding role,

the unscientific setting of the weights of the evaluation indicators, the lack of matching between the evaluation results and the actual situation, and the lack of incentives. After the optimization of the new scheme, in view of the above situation, this paper conducts a targeted anonymous questionnaire survey. Figure 8 shows the results of the guiding role of the assessment indicators for counselors.

According to the analysis of the questionnaire, the new scheme has a certain degree of improvement compared with the original scheme in terms of weak index guidance, unscientific setting of assessment index weights, and lack of incentives, and has certain application value.

### 5. Conclusion

It is proved by experiments that the selection of the initial cluster center of the Kmeans clustering algorithm is optimized, so that better accuracy is finally obtained. Based on the general development goals of a university, the departmental goals of the Student Affairs Office, and the content of the relevant documents of the Ministry of Education, this

paper draws the work goals of a university counselor, submits it to an expert group, and seeks opinions and suggestions from the expert group, and determines the counselor's job goals. The work objectives are personal quality, student development, student service, student management, career development and work performance, which are the first-level indicators of performance appraisal. The 6 goals were decomposed, the opinions of experts and some counselors were solicited, and 34 secondary indicators for the performance evaluation of a college counselor were determined. At the same time, the weights of the first- and second-level indicators are determined by the AHP. This paper analyzes the current situation of the performance appraisal of a college counselor, points out the existing problems and reasons, and further analyzes the necessity, feasibility, and difficulty of the design of the counselor's performance appraisal program. We use the Balanced Scorecard to select the indicators, use the AHP to set the weights of the indicators, and use the behavioral anchoring method to set standards for the evaluation of the indicators, so as to build a scientific counselor with internal logic and accurate measurement. The performance appraisal plan can play the guiding role of the performance appraisal, so that the counselor can focus more on the goal work of Lide Shuren.

### Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

### Acknowledgments

This work was supported by School of Public Policy & Management, China University of Mining & Technology.

### References

- [1] J. N. Nnah Ugoani, "Performance appraisal and its effect on employees' productivity in charitable organizations," *Business, Management and Economics Research*, vol. 6, no. 612, pp. 166–175, 2020.
- [2] M. Nadeem, S. Arif, and M. Z. Asghar, "Development and validation of performance appraisal scale (pas-hssts) for higher secondary school teachers," *Sjesr*, vol. 3, no. 3, pp. 105–116, 2020.
- [3] N. Süzen, A. N. Gorban, J. Levesley, and E. M. Mirkes, "Automatic short answer grading and feedback using text mining methods," *Procedia Computer Science*, vol. 169, pp. 726–743, 2020.
- [4] H. N. Ismail and M. Rishani, "The relationships among performance appraisal satisfaction, career development and creative behavior," *The Journal of Developing Areas*, vol. 52, no. 3, pp. 109–124, 2018.
- [5] J. W. Carter and C. M. Y. Morgan, "The positive psychology of mentoring: a longitudinal analysis of psychological capital development and performance in a formal mentoring program," *Human Resource Development Quarterly*, vol. 30, no. 3, pp. 383–405, 2019.
- [6] J. A. Leveto, "Exploring the relationships between discrepancies in perceptions of emotional performance among college students on self-esteem and psychological distress," *Current Psychology*, vol. 39, no. 5, pp. 1661–1673, 2020.
- [7] S. Naeem and A. Wumaier, "Study and implementing K-mean clustering algorithm on English text and techniques to find the optimal value of K," *International Journal of Computer Application*, vol. 182, no. 31, pp. 7–14, 2018.
- [8] A. Aydın and S. Tiryaki, "Impact of performance appraisal on employee motivation and productivity in Turkish forest products industry: a structural equation modeling analysis," *Drvna Industrija*, vol. 69, no. 2, pp. 101–111, 2018.
- [9] B. Chahar and V. Hatwal, "A study of performance management system in higher education institution with special reference to academicians," *Journal of Emerging Technologies and Innovative Research*, vol. 5, no. 6, pp. 350–353, 2018.
- [10] P. R. Prasath, S. Lindinger-Sternart, and T. L. Duffey, "Counselors as organizational leaders: e," *Journal of Counselor Leadership and Advocacy*, vol. 8, no. 2, pp. 146–156, 2021.
- [11] Q. O. Okeleke and M. A. Oladejo, "Employee information sharing and job performance in public colleges of education in South-West, Nigeria," *Journal of Educational Research*, vol. 39, pp. 107–117, 2021.
- [12] J. I. Z. Chen and J. I. Zong, "Automatic vehicle license plate detection using K-means clustering algorithm and CNN," *Journal of Electrical Engineering and Automation*, vol. 3, no. 1, pp. 15–23, 2021.
- [13] P. R. Padhaya, L. Bhattarai, L. N. Acharya, and S. Adhikari, "Performance appraisal system and effectiveness of universities in Nepal," *International Journal of Advance Research, Ideas and Innovations in Technology*, vol. 7, pp. 43–48, 2021.
- [14] M. S. Davis and M. A. Mensah, "Performance appraisal of employees in tertiary institutions: a case study of university of education, winneba (winneba campus)," *International Journal of Human Resource Studies*, vol. 10, no. 2, Article ID 175196, 2020.
- [15] A. L. Meinecke and S. Kauffeld, "Engaging the hearts and minds of followers: leader empathy and language style matching during appraisal interviews," *Journal of Business and Psychology*, vol. 34, no. 4, pp. 485–501, 2019.
- [16] Z. Wang, K. Wang, S. Pan, and Y. Han, "Segmentation of crop disease images with an improved K-means clustering algorithm," *Applied Engineering in Agriculture*, vol. 34, no. 2, pp. 277–289, 2018.
- [17] T. J. Tersoo, D. Hembadoon, and L. O. Ekeh, "Effect of employee performance appraisal on organisational commitment in the banking sector in Benue State, Nigeria: a study of First Bank of Nigeria Plc," *International Journal of Current Aspects in Human Resource Management*, vol. 1, no. 2, pp. 160–178, 2018.
- [18] H. M. Ariani and D. Ratnasari, "Effect of emotional intelligence against employee performance in department of labor and social," *JBFEEM*, vol. 1, no. 1, pp. 37–50, 2018.
- [19] A. J. Arfasa and F. M. Weldmeskel, "Practices and challenges of guidance and counseling services in secondary schools," *Emerging science journal*, vol. 4, no. 3, pp. 183–191, 2020.
- [20] A. Ahmad, R. Z. A. R. Ibrahim, and A. Abu Bakar, "Factors influencing job performance among police personnel: an empirical study in Selangor," *Management Science Letters*, vol. 8, no. 9, pp. 939–950, 2018.
- [21] M. M. Sudiyono and H. E. Mulyasa, "Process and results of lecturer performance assessment through internal quality

- assurance unit of private universities in Bandung-West Java, Indonesia,” *International Journal of Educational Research*, vol. 8, no. 9, pp. 47–58, 2020.
- [22] N. M. Hurd, J. Albright, A. Wittrup, A. Negrete, and J. Billingsley, “Appraisal support from natural mentors, self-worth, and psychological distress: examining the experiences of underrepresented students transitioning through college,” *Journal of Youth and Adolescence*, vol. 47, no. 5, pp. 1100–1112, 2018.
- [23] Y. Yu, S. A. Velastin, and F. Yin, “Automatic grading of apples based on multi-features and weighted K-means clustering algorithm,” *Information Processing in Agriculture*, vol. 7, no. 4, pp. 556–565, 2020.
- [24] I. V. Pustokhina, D. A. Pustokhin, J. J. P. C. Rodrigues et al., “Automatic vehicle license plate recognition using optimal K-means with convolutional neural network for intelligent transportation systems,” *IEEE Access*, vol. 8, pp. 92907–92917, 2020.
- [25] N. Y. Entsie, O. C. Clement, and F. O. Clara, “Challenges facing continuing professional development (CPD) of academic staff of the colleges of education in Ghana,” *International Journal of Educational Administration and Policy Studies*, vol. 12, no. 2, pp. 112–120, 2020.