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Retraction

Retracted: Ideology in Sino-Foreign Cooperative Education: The Application of Big Data Mining Technology in the Work Conducted by Counselors

Mobile Information Systems

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] Z. Shu, "Ideology in Sino-Foreign Cooperative Education: The Application of Big Data Mining Technology in the Work Conducted by Counselors," *Mobile Information Systems*, vol. 2022, Article ID 4062281, 12 pages, 2022.

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Research Article

Ideology in Sino-Foreign Cooperative Education: The Application of Big Data Mining Technology in the Work Conducted by Counselors

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The globalization of today's world economy is developing in depth, and international education has gradually taken a new step in order to cultivate higher education talents who can adapt to the new context of development. Sino-foreign cooperative education is the main means for the country to carry out international education and foreign exchange, and it aims to cultivate complex talents who can adapt to the new international trade and exchange in the world. Due to the special nature of the student source and the complexity of the purpose of the school, the teaching concept and mode of Sino-foreign cooperative schools differ greatly from the traditional general higher education, which also puts forward strict requirements on the professional level of counselors. As an emerging technology, big data mining technology has a unique advantage in optimizing the processing and management of a large amount of data. The application of big data mining technology to the management of counselors in Sino-foreign cooperative education is important for improving the quality of education, establishing an efficient educational model of Sino-foreign cooperative education, and promoting the international modernization of national education.

1. Introduction

Ideological work has an important strategic position in the overall situation of national development, and firmly grasping the Party's dominant power and right to speak in the field of ideology is the top priority of the work of the whole Party. In recent years, the state and the government have issued many legal documents to strengthen the guidance in the field of ideological work, and the issuance of the Measures for the Implementation of the Party Committee's Responsibility System for Ideological Work has brought ideological work down to the grassroots organizations [1]. In the report of the 19th Party Congress, the Party made a complete elaboration on strengthening ideological work, indicating the direction of further consolidating the Party's leadership of ideological work in the new era. And the frontier of ideological work is higher education institutions, and colleges and universities, as an important stage to make people move from maturity to immaturity, have an important role in cultivating college students' core values and outlook on life [2].

As an important frontier zone of education for internationalization and modernization, Sino-foreign cooperative education has an extremely important position in the field of education. It follows the development trend of economic globalization and makes an important contribution to the construction of the community of human destiny. Compared with the traditional teaching mode, Sino-foreign cooperative education has cultivated a batch of comprehensive talents who can adapt to the new international trade in the world and have an international vision with the advantages of a unique faculty team, new specialties, and employment prospects. However, under its unique mode of schooling, some ideological problems have arisen. Since the training objectives of Sino-foreign cooperative education are different from those of ordinary higher education, the management level of counselors is more demanding. There are big differences between Chinese and Western cultures;

therefore, the daily behavioral habits and thinking directions of international students from different countries are often different. Besides, the values of college students also show diversified characteristics. It is worth being alert to the fact that Western culture is easy to infiltrate the values of Chinese students by using its hidden characteristics. During the critical period when students' worldviews, outlook on life, and values are not yet formally formed, the pluralistic values tend to "westernize" students' thinking patterns, and students may have deviations in their perceptions of social forms, cultural systems, and political directions. In addition, students are easily influenced by the "individual heroism" and "money worship" in Western culture and develop the concept of flattering foreigners and losing confidence in their own excellent traditional culture, resulting in "national nihilism" [3]. The ultimate consequence is that students have a weak sense of the collective concept, their ideals and beliefs are not firm enough, and their moral concepts are biased and slippery, which is contrary to the original purpose of the national cooperative education. Therefore, improving the effectiveness of counselor management is a key point in the work of improving the management level of cooperative schools.

At the meeting of the Political Bureau of the Central Committee of the Communist Party of China (CPC), in response to the implementation of the national big data collective learning strategy, President Xi Jinping pointed out that the development of big data is very fast today, and all people should carefully lay out and pay attention to the impact of big data on economic and social development; observe its development status and future direction through investigation; and build a digital China that contributes to national economic and social development and people's happiness and well-being [4]. According to the report of the 19th Party Congress, the primary position in the cause of people's livelihood is education, and accelerating the modernization of education is an urgent task for the country. Nowadays, the development of various social industries is being profoundly influenced and changed by big data mining technology, and school education is no exception. Higher education is an important stage to bring people from immaturity to maturity and plays a pivotal role in cultivating talents for national modernization. Therefore, promoting Internet + education and deepening the application of big data mining technology into the daily work of counselors is a key decision to solve the problem of insufficient and unbalanced development of education.

Big data mining technology not only has the commonly used functions of finding, comprehensively managing all kinds of information, collecting and analyzing data, and conducting statistics but also has the ability to process those lines of information that are hidden and useful in the database through data mining technology [5], providing valuable guidance for school management and teaching work and promoting the work of college counselors. At present, most colleges and universities only deal with data mining technology in low-level searching and simple analysis, so school leaders and the majority of research workers should focus on the key issue of how to mine the information data with high value and high guidance, which is also the common point in the application and research of data mining technology in various industries of the country. For example, at the end of each semester, the school organizes a survey on students' satisfaction with the work of counselors to consider the work of counselors. It is very meaningful for universities to make good use of the survey information so as to draw out valuable information for the management of school counselors and to make scientific analysis and judgment on each stage of student management and education through this information.

2. Research Background

2.1. Sino-Foreign Cooperative Education

2.1.1. Development Status. In 1986, the Sino-American Cultural Studies Center institution was established through the joint efforts of Nanjing University and Hopkins University, which is, in a strict sense, the first real Sino-foreign cooperative school institution in history. From 1995 to 2017, the number of Chinese-foreign cooperative institutions has grown from more than 70 to 2,572 under the approval of relevant state auditing departments, spreading across all types of teaching modes, covering 28 provinces across the country, and offering more than 200 majors. In 2015, the Strategic Alliance of Belt and Road Universities with the function of cultivating cross-border mobile talents was jointly constructed by 46 universities from East and West [6].

Sino-foreign cooperative education has been strongly supported by national policies, and the number of approved Sino-foreign cooperative education projects and institutions has been climbing in recent years, and Sino-foreign cooperative education projects are on a stable upward trend [7]. Except for 2018, when the number of school running projects decreased by 4 compared with 2017, all other years showed an increasing trend, and the overall level was on the rise. The number of schooling institutions also shows an upward trend in the general trend, especially in the first half of 2020 alone, there were five more schooling institutions than in 2019. Detailed data are shown in Figure 1.

By the end of 2019, among all the double first-class construction universities in China, 189 Chinese-foreign cooperative school running projects have been reached [8]. The top five provinces in the number of projects in the subprovinces of Sino-foreign cooperative schooling institutions and projects in double first-class construction universities are Jiangsu, Beijing, Henan, Shanghai, and Heilongjiang (Figure 2).

The foreign cooperative institutions and projects of "double first-class" universities are mainly located in 16 countries and regions [9]. Among them, the cooperative objects of the undergraduate stage of Sino-foreign cooperative education projects in the "double first-class" construction universities are mainly concentrated in the United States, the United Kingdom, Australia, France, Germany, and other Western countries with developed higher education, and the number of cooperative education projects

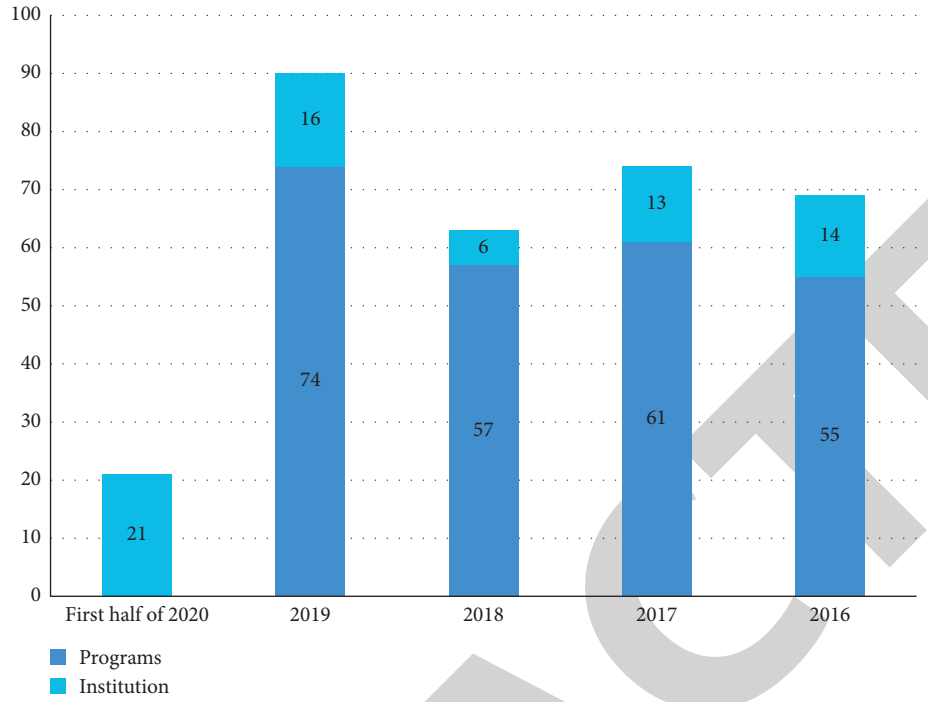

Figure 1: Number of approved Sino-foreign cooperative school projects and institutions in the past 5 years.

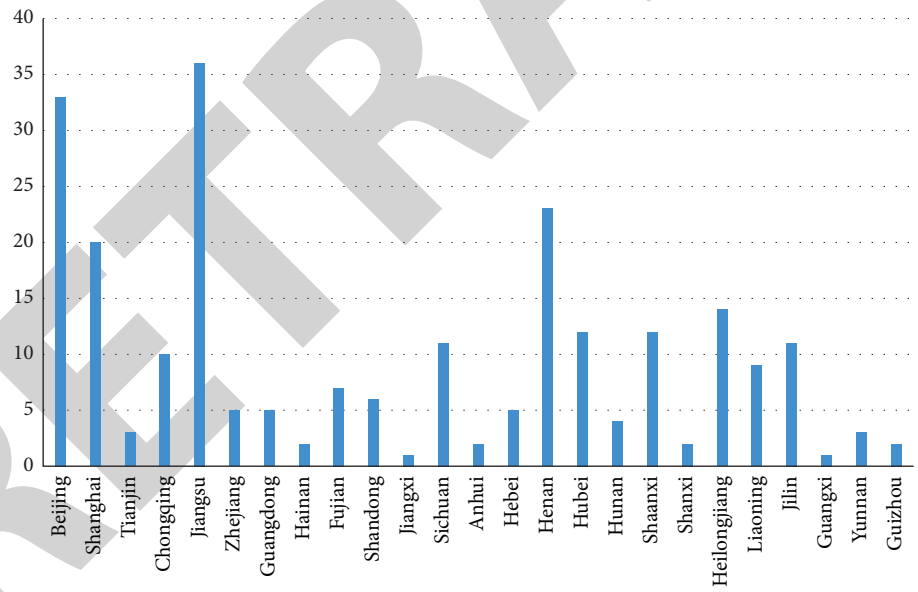

Figure 2: "Double first-class" construction universities of Chinese and foreign cooperation institutions and projects by province (as of 2019, excluding independent legal person institutions).

held with the universities of the above five countries accounts for about 10% of the "double first-class" construction universities. The number of cooperative education projects with universities in the above five countries accounts for about 80% of the total number of cooperative education projects at the undergraduate level of the "double first-class" construction universities. Other countries and regions with a high number of cooperative education projects are mainly concentrated in countries and regions with high level of higher education in Europe, America, and Asia, such as Ireland, Canada, Korea, etc. The detailed situation is shown in Figure 3.

In order to ensure the quality of education, the number of students enrolled in the first year of Sino-foreign cooperative education institutions is smaller than the approved enrollment scale but increases year by year as the education

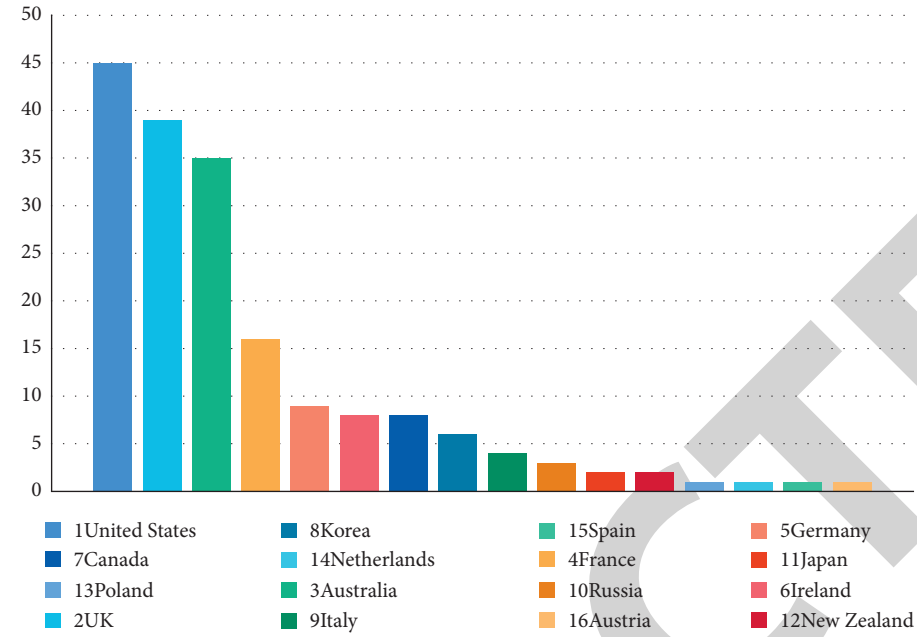

Figure 3: Distribution of countries and regions of cooperation between Chinese and foreign cooperative education programs and institutions at the undergraduate level of "double first-class" construction universities (excluding independent legal person institutions).

matures [10]. Among them, the enrollment of NYU Shanghai has increased from 151 in 2014 to 251 in 2020 (Figure 4).

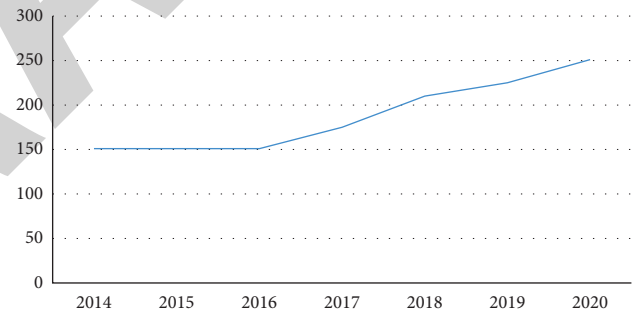

Figure 4: Trend of enrollment size of NYU Shanghai (2014–2020).

2.1.2. Problems and Challenges. Firstly, there are various challenges in terms of professional course exhaustion and student life adaptation. Under the national enrollment mechanism, the admission score line of Sino-foreign cooperative schools is usually below the undergraduate line, which means that the vast majority of students' academic level is weak, their learning ability needs to be improved, and their level is uneven, which prevents centralized and effective unified management. Since students have to face the pressure of language score assessment when they go abroad, some of them need to devote a lot of time and energy to study English, which makes them go off the beaten track and often use the leave of absence from school to improve their foreign language skills. In the long run, their enthusiasm for learning basic and specialized courses will be extinguished, and it is difficult for them to adapt to the diversified assessment mode of the school, and they are unable to effectively regulate themselves under the double pressure of specialized and foreign language courses. In addition, the tuition fees of Sino-foreign cooperative schools are often high, so students' families are generally well-off. Like the flowers in the greenhouse, they are highly cared for by their families since they are young, and it is difficult for them to adapt well to the high-pressure study life, so they tend to show the disadvantages of discipline breakdown and inability to take care of themselves. In addition, some students do not know enough about foreign folk customs and legal system and their seemingly insignificant actions often bring safety hazards to themselves, making them unable to integrate into a foreign environment better.

Second, the management of cross-border students is not sustainable and effective. Compared with other models, Sino-foreign cooperative education models are quite different, as they generally adopt the "2 + 2" and "3 + 1" models, in which students study in China for 2 to 3 years and then complete the rest of their studies abroad to obtain dual degrees from domestic and foreign schools [11]. During the school period, students' ideological and political education work is not fully prepared and in place, and the key period to effectively carry out patriotic collective education and ideal and belief education is exactly when students are studying in China, which makes students spend most of their time and energy on studying professional courses and foreign language courses, thus causing the lack of ideological and political education work. This brings a great challenge to the management of counselors, and how they can optimize the ideological and political education work of college students

within the specified time becomes the most important work. Because of the spatial distance and global time difference, the counselors cannot manage the overseas students uniformly and effectively, which seriously restricts the cultivation and guidance to the overseas students.

Based on the above differences, the work in the field of ideology in colleges and universities with Sino-foreign cooperation is often more complicated, which puts forward more precise and special requirements for the management level of counselors, who need to formulate targeted and effective management measures according to the special characteristics of colleges and universities with cooperation. They should make correct analysis and judgment on the ideology of universities run by Sino-foreign cooperation, constantly strengthen the political function of the party organization of universities under the premise of following the orientation of socialism in running schools, precisely position the direction of running schools and talent cultivation mechanism in the reform of universities run by Sino-foreign cooperation, effectively carry out ideological work, and do it according to the time and advance with the trend.

3. Materials and Methods

3.1. Big Data Mining Technology

3.1.1. Meaning and Development Status. The researcher studies the object and content-related knowledge from the rhesus data, which are in various forms and can be rules, concepts, etc. This information is not obvious and predicted in advance, but it must be useful information. And data mining is the decision support process of finding the object of study in a collection composed of many data. Data mining is a process in which humans and machines are constantly exchanging with each other and there are numerous steps closely connected [12]. Some of the key steps are: asking a question, selecting data, organizing and determining data, constructing a model, judging, and interpreting (Figure 5).

All these steps are subject to a continuous iterative process of proceeding. Data mining is not a single discipline, but it is a blend of many disciplines. Previously, the application of data was relatively superficial, but now, through data mining, researchers can fully exploit the empirical and theoretical knowledge in it to provide decision support, which is the task of data mining. The obtained knowledge can supplement and improve the existing knowledge system as well as provide support and assistance to decision makers in their decision-making process, and can also be stored as new knowledge in the relevant stored knowledge institutions. Data mining technology has not appeared in the limelight only in recent years but has been studied abroad for many years. With the rapid development of data mining technology and decision support systems, many industries represented by the retail industry have achieved high-profit growth, which has attracted the attention of many universities and research institutions, and they have invested a lot of money and energy in deep mining development and research. Data mining technology in China, on the other hand, started late and is still in its infancy. A large part of the work lacks comprehensive system integration design and is only limited to the top of local algorithm design. At present, only finance, banking, GIS, and other fields have initially applied data mining technology, which is inseparable from the lack of core technology [13].

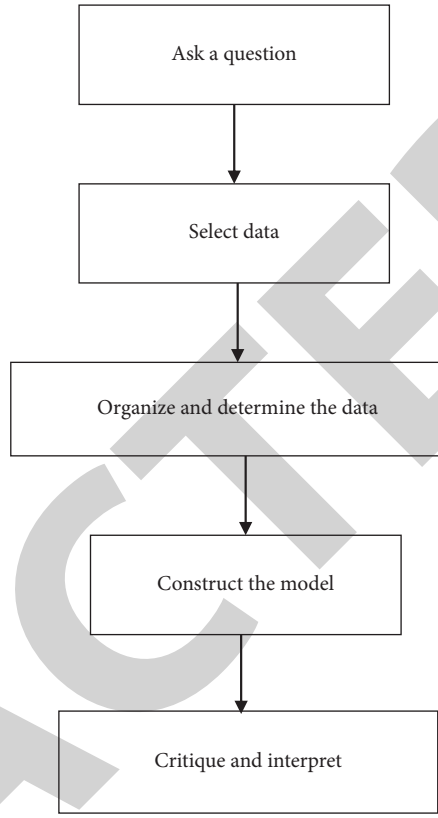

Figure 5: Data mining steps.

3.1.2. Application. Data mining, as a deep method of data research and analysis, is a process of affirmation from the proposal of a program, and if this technology is put into the work assessment and examination system of counselors in cooperative schools, it can improve the management utility level of counselors and make the work achieve twice the result with half the effort. For example, the data on the "quantitative assessment form of counselors' work" can be used by data mining [14] to make a comprehensive performance evaluation of the management level of counselors in a university, listing which tasks counselors have done well and which tasks are lacking in management. In the past, colleges and universities usually used to look up information data in the form of information on the effectiveness of counselors' work. Now, the researcher can use data mining technology to process the information and data on counselors' work effectiveness and then make good use of the data and apply it to the management of counselors. The data mining process is shown in Figure 6.

Step 1: Determining the object and purpose of data mining. Very definitely clarifying the problem and discovering and finding the target of data mining is the

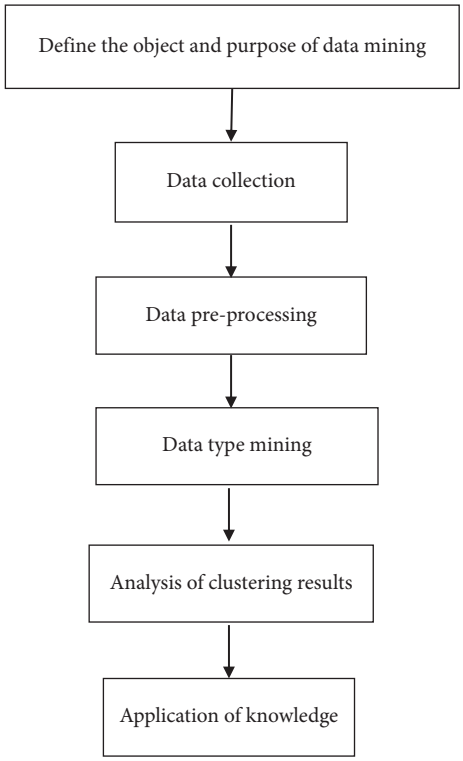

Figure 6: Clustering data mining process.

first and very important step in the process. The final result cannot be predicted, but the research problem can be anticipated in advance through data mining.

Step 2: Data collection. The data collection is more laborious and requires a lot of time and effort. This requires the collector to carefully collect all kinds of data and information in the usual educational activities, some of which can be directly obtained, while some data must be discovered through research and study.

Step 3: Data preprocessing. This step is to convert the collected data into a data model, which is analyzable and based on different algorithms, so the requirements of different kinds of algorithms for data models are very different.

Step 4: Data clustering mining. The data model is split into multiple groups by the data clustering mining technique. These words are split based on the magnitude of similarity; the greater the similarity, the greater the likelihood of being grouped together. This step is the selection and implementation process of the clustering algorithm and the input process of the data model.

Step 5: Analysis of clustering results. This process is the selection judgment and analysis of the information after clustering data mining and the judgment of the results of multiple group attributes.

Step 6: Application of knowledge. This is the final step, which is to apply the useful information obtained in the previous steps to the management activities of the counselors' education so that the counselors can draw useful conclusions to improve their management teaching and form a practical and effective management policy. This is also the purpose of the thesis research.

3.2. Design Scheme

3.2.1. Identifying Data Mining Objects and Targets. The researcher collected and compiled 120 "quantitative assessment forms of counselors' work" from a university with Sino-foreign cooperation and tried to answer questions like what is the overall management level of counselors in this university? What work is done well and what work is not done well in management? We hope that by processing these data through data mining technology, we can draw some important conclusions and bring practical guidance for teaching and management.

3.2.2. Data Collection. Through the data collection of 120 "quantitative assessment forms of counselors' work" of a Sino-foreign cooperative university, the researchers were well prepared for the information sources to be used in the data mining technique.

3.2.3. Data Preprocessing. The "quantitative assessment form for counselors" has several evaluation indicators for counselors who are required to be evaluated: "to reward and punish each student clearly and treat each student objectively and fairly," "to grasp and understand the situation of poor students and do a good job of grant allocation," and "to do a good job of grant allocation." The indicators are: "rewarding and punishing, treating every student objectively and fairly," "understanding the situation of poor students and doing a good job in allocating grants," "doing a good job in granting student loans," and many other indicators. Based on the performance level of the counselors, the counselors are divided into five grades, which are "excellent, good, average, poor, and very poor."

In the work assessment quantification table, there are a total of 15 items of assessment levels. How to synthesize these data into a template for cluster analysis through data mining techniques was a challenge for the researchers to transform the data. In this regard, the researchers chose to reorganize and integrate the information data in the quantitative job evaluation form in four areas: "management attitude," "management ability," "management style," and "management performance."

The "management attitude" corresponds to the table's "clear rewards and punishments, treating each student objectively and fairly," "appropriate behavior and good personal qualities," "friendly and harmonious relationship with students," and "acting objectively and fairly, and being honest."

The "management ability" corresponds to the table's "understanding of the situation of poor students and the distribution of grants," "using a special approach to special groups of students and meeting the specific needs of special

students," "not to protect shortcomings, in accordance with the school regulations to deal with disciplinary students seriously," "in the evaluation of merit and awards to achieve a high level of transparency and adhere to the principles of fairness, impartiality, and openness," and "have strong organizational management skills, actively organize strong organizational and management skills, and actively organize and mobilize students to carry out various work activities."

The "management style" corresponds to the "care for students' study, work, and life, at least twice a week to check the dormitory," "insist on weekly inspection of students' dormitory hygiene," "talk with each student at least once a year," "actively participate in and supervise students' morning jogging activities," and "complete procedures for school scholarships, grants, and student loans and issue them." The procedures for granting scholarships, grants, and loans are complete and in place.

"Management performance" corresponds to the table's "conducts informative and effective class meetings," "understands students' learning situation in depth during class," and "can give reasonable suggestions to students about their learning and criticize and correct students' deficiencies."

The attribute values for these four attributes can be approached in several ways.

First, the researchers converted each individual assessment rating in the table into a more easily understood and calculated data type. The five levels of the appraisal scale, "excellent, good, fair, poor, and very poor," can be regarded as ordered data types in statistics, and they are arranged in an order that has a special meaning.

The values of the four attributes can be calculated using the arithmetic mean of the items they contain.

"Managerial attitude" = (objectivity and impartiality + rapport with students + decent behavior + integrity)/4.

"Management ability" = (mastery of understanding the situation of poor students + meeting the specific needs of special students + serious handling of disciplinary students in accordance with school regulations + - transparency and openness in the evaluation of merits, prizes, and awards + strong organizational and management skills)/5.

"Management style" = (achieving at least two or more dormitory inspections per week + insisting on weekly inspections of student dormitory hygiene + talking to each student at least once per academic year + actively participating in and supervising students' morning jogging activities + complete procedures for scholarships, grants, and student loans and their disbursement)/5.

"Management performance" = (carrying out informative and effective class meetings + in-depth understanding of students' learning conditions in class + reasonable learning suggestions to students, criticism, and correction of their shortcomings)/3.

As a result of the above work, the 15 items in the quantitative work evaluation form as well as an after-class mastery and comments and suggestions section were all grouped into four attributes: "management attitude, management ability, management style, and management performance." The following is the process of the researcher's analysis and study of data from 120 quantitative job evaluation forms using big data mining technology methods.

3.2.4. Data Clustering Mining. Using the preprocessed data sample information statistics, the researchers collected the sample data to be used in the analysis process as shown in Table 1.

(1) Expected results obtained: the data sample information listed above was classified into three levels: better, moderate, and poor. The mining technique of cluster analysis is used to further derive the proportional distribution of the sample data information distribution in relation to the above three levels of ranking. The researcher tried to answer the question of "how good or bad is the overall management of counselors" and "what is working well? What is not working well enough?," etc.

(2) The selection of mining methods: From the clustering method, it can be seen that the algorithm based on density, grid, and model is not strong for these small and medium data types, so the classical algorithm k-means and k-central value algorithm in the clustering method can be used to study and analyze this type of data mining. According to the definition of the algorithm, k can represent the number of categories needed for the study. The most basic idea of these two classical algorithms is to divide n objects into k classes so that objects in the same class have high similarity and objects in different classes have low similarity to each other. The mean value in each class is the reference value for the k-means algorithm, while the k-centroid algorithm uses the point object at the center of the class as the reference value for calculating the dissimilarity.

The k-centroid algorithm has an advantage over the k-means algorithm when there are isolated or outlier points in the data object, which is related to the fact that centroids are less susceptible to isolated points, while means are susceptible to isolated points [15]. However, the k-centroid algorithm is more complicated compared to the k-means algorithm. Assuming that the complexity of the k-means algorithm is represented by X, it is calculated that $X = nkt$ (n represents the number of classes and t represents the number of iterations); assuming that the complexity of the k-centroid algorithm is represented by Y, when the k-centroid algorithm performs one iteration (an iteration is an activity that repeats the feedback process, usually to approximate the desired goal or result), the complexity of the algorithm afterwards has become $Y = k(n-k)^2$.

Table 1: Sample data for clustering.

Management attitude	Management ability	Management style	Management performance
0.65	0.6	0.56	0.58
0.65	0.6	0.56	0.58
0.35	0.35	0.31	0.33
0.76	0.76	0.68	0.75
0.8	0.8	0.81	0.83
...	...	...	...

$$X = nkt(3-1),$$
$$Y = k(n-k)^2(3-2), \quad (1)$$

where X represents the k-means algorithm complexity and Y represents the k-centroid algorithm complexity.

Based on the above sample data, four types of attributes, namely "management attitude, management ability, management style, and management performance," are obtained by data transformation. The data used are the arithmetic mean of items 3, 4, and 5 in the quantitative work appraisal table, so it is unlikely to generate isolated points or outlier points. Based on the above analysis, the researchers selected the k-means algorithm to perform data mining.

(3) Improvement of data samples: When executing the k-means algorithm, in order to get the global optimal solution as much as possible, it is necessary to try to reduce the skew of the sample data, which requires the researchers to improve the sample data. To this end, in the initial state, the top three data samples are classified as the central case of clustering, and after taking further steps to improve the k-means algorithm by combining the desired results with the integrated proportional distribution on the three rating levels described earlier, the samples that can represent the three levels are derived to replace the first three sample data that have been defined, thus serving as the center of clustering at the beginning, to the greatest possible extent possible to reduce the skewness of the data and the number of iterations performed [16]. The data as samples for the three classes are shown in Table 2.

(4) The flow of the algorithm is shown in Figure 7.

In the k-means algorithm, the function LoadPatterns (Char * fname) is the process of loading the sample data information into the program. The main purpose of this function is to read out the relevant information from the database file km.dat and convert the data in this file into the sample Patten[i][j] array.

The function InitClusters() functions as the initialization process of the class centers, and the function starts with the first K data in the data sample as the starting class centers.

The function RunKMeans() functions as the main procedure of the algorithm, and the main procedure is to compare the distance of all objects with the center of each cluster. Then the objects are divided into the classes with the nearest class centers, and the cluster centers are calculated according to the redistribution, and if the class centers do not change, then the clustering process is terminated.

The ConvFlag is used as an identifier for whether the clustering is complete or not, the function ShowCenters() represents the cluster centers described by the algorithm, and the function ShowClusters() represents the identifier number of the samples described by the algorithm [17].

4. Results and Discussion

4.1. Results. In the analysis of the data obtained after data conversion using the k-means algorithm, 120 sample data of the work appraisal quantification table, which contains three standard samples representing the degree, namely better, moderate, and worse, and another 117 sample data were obtained by data conversion of the work appraisal quantification table. In this, all the sample data have four major aspects, namely management attitude, management ability, management style, and management performance. The data mining analysis was conducted on these four aspects, and the initial k value was set to 3, and the final mining results were obtained as shown in Table 3.

4.2. Analysis and Discussion. From the data in the table, it can be seen that the final proportional distribution of the sample data contained in each class is characterized as follows.

The first class, that is, the better group, has a total of 36 samples, and after removing a standard sample defined in advance, that is, "better," there are 35 samples left, accounting for 35/117 = 30% of the 117 samples obtained after data transformation.

The second category, the moderate group, has 74 samples in total, and after removing a predefined standard sample, that is, "moderate," 73 samples remain, accounting for 73/117 = 62% of the 117 samples obtained after data transformation.

The third category, that is, the poor group, has a total of 10 sample data, and after removing a standard sample defined in advance, that is, "poor," there are 9 sample data left, accounting for 9/117 = 8% of the 117 sample data obtained after data transformation.

In order to estimate the final results of the data mining, the researcher took a whole group sampling method to randomly select a total of 248 students of a certain major from the university and then investigated the comprehensive quantitative scores of the ten activities organized by the students of the major. By setting the total score at 100, the

Table 2: Sample data representing the three ranks.

	Management attitude	Management ability	Management style	Management performance
Four categories of attribute values indicate a better situation	0.75	0.75	0.75	0.75
The four types of attribute values indicate the moderate situation	0.5	0.5	0.5	0.5
The four types of attribute values indicate the worse case	0.25	0.25	0.25	0.25

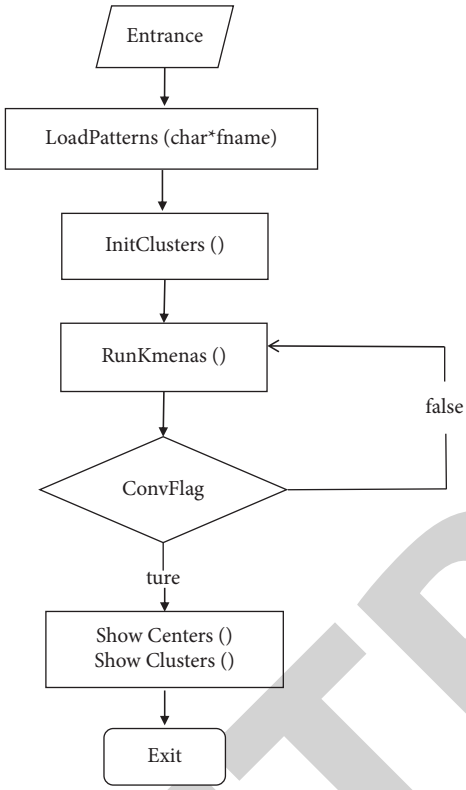

Figure 7: Flowchart of algorithm implementation.

three rating levels were below 60, 60 to 80, and above 80. The final classification results are shown in Figure 8.

When comparing the composite quantitative scores of the two categories (above 80, 80 to 60 (including 80 and 60), and below 60) with the levels used for clustering (0.75, 0.5, and 0.25), the percentage of branches in each category has increased, and the above analysis shows that the percentage of the three categories of scores is 21%, 68%, and 11% with the three categories of clustering. The sample proportions of the three categories of score bands, that is, 21%, 68%, and 11%, coincide with the sample proportions of the three categories of clusters, that is, 30%, 62%, and 8%.

The above results verified that such a data mining model adopted based on the quantitative table of counselors' work assessment is a practical and effective model and also showed that data mining technology can be applied to the management of counselors, which brings significant reference and guidance significance for improving the management level of Sino-foreign cooperative universities and for improving and developing the management and education of college counselors.

The results of the data mining were recombined, and the standardization degree of the three rating levels was carefully considered. After careful comparison, it was found that the attributes of the three rating levels directly improved compared with the well-defined standard sample, except for the attribute value of 0.74 for the first-class management method item, which was lower than that of 0.75 for the well-defined standard sample. This indicates that the overall scores of all classes have been improved. The overall score of each individual item was then used for further analysis and judgment. Due to the insufficient sample size, the researcher used a weighted approach for each item. The overall scores for each of the four individual items in the following categories were as follows:

"Management attitude" $= 0.77 * 30\% + 0.61 * 62\% + 0.31 * 8\% = 0.634$

"Management ability" $= 0.77 * 30\% + 0.57 * 62\% + 0.31 * 8\% = 0.6092$

"Management style" $= 0.74 * 30\% + 0.54 * 62\% + 0.28 * 8\% = 0.5792$

"Management performance" $= 0.79 * 30\% + 0.56 * 62\% + 0.30 * 8\% = 0.6082$.

The overall scores for the four items above were ranked from lowest to highest: management style (0.5792), management performance (0.6082), management competency (0.6092), and management attitude (0.634). These data all have one thing in common, that is, all scores are greater than 0.5, that is, they are all in the middle to upper level, which indicates that the overall management level is also in the middle to upper level, which is a relatively good result. Moreover, it is easy to find that the difference between the highest score of "management attitude" and the lowest score of "management method" is only 0.0548, which is equivalent to a difference of 5.48%. This means that while coordinating the work of each project, they should focus on strengthening the "management style" (caring for students' study, work, and life and checking the dormitory at least twice a week), "insist on weekly inspection of students' dormitory hygiene," "talk with each student at least once a school year," "actively participate in and supervise the students' morning run." "The requirements and management of the school scholarships, grants, and student loans are complete and the procedures for granting them are in place. Relatively speaking, the student work department has a "management attitude" (rewards and punishments are clearly defined, and each student is treated objectively and fairly), "good behavior and good personal qualities," and "friendly and harmonious relations with students." We do not need to

Table 3: Clustering results.

	Management attitude	Management ability	Management style	Management performance	Sample size number
Class 1 (better)	0.77	0.77	0.74	0.79	36
Class 2 (medium)	0.61	0.57	0.54	0.56	74
Class 3 (poorer)	0.31	0.31	0.28	0.30	10

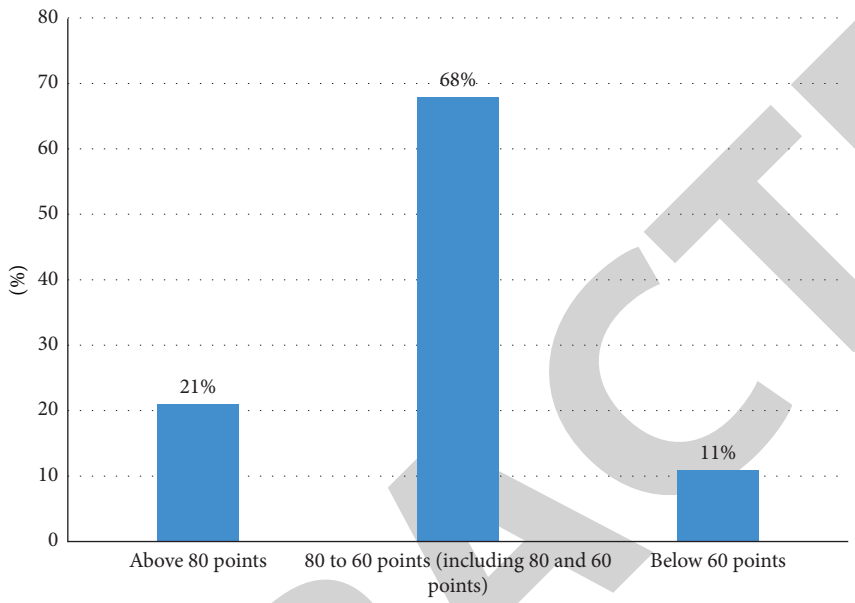

Figure 8: Comparison of analysis results of comprehensive quantitative score situation.

focus so much on "management attitude" (rewarding and punishing students objectively and fairly, treating each student objectively and fairly, "behaving well and having good personal qualities," "having a friendly and harmonious relationship with students," and "acting objectively and fairly, and being honest"). For "management performance" ("conducts informative and effective class meetings," "understands students' learning conditions in class," "gives reasonable suggestions to students about their learning," and "criticizes students' shortcomings," and criticizing and correcting students' deficiencies) and "management skills" ("understanding the situation of poor students and doing a good job of allocating grants," "adopting a special approach to special groups of students and meeting the specific needs of special students," "not to protect shortcomings, in accordance with the rules of the school to deal with disciplinary students seriously," "in the evaluation of merit and awards to achieve a high level of transparency and adhere to the principles of fairness, impartiality, and openness," and "have strong organizational management skills, actively organize strong organizational management skills, and actively organize and mobilize students to carry out various work activities") can be coordinated and balanced, rational and organised activities. The most important thing is that as counselors of universities with Sino-foreign cooperation, they should correctly grasp the relationship between these four aspects and adhere to the principle of unity of two points and focus, not only should they not look at these four aspects without prioritizing them, but also should not focus on one of the items and ignore the work of other items.

In addition, using big data mining technology to establish the evaluation system of student management in colleges and universities with Sino-foreign cooperation is a good choice for improving school management information [18] and reducing the work pressure of counselors. The system can provide counselors with data, materials, background, and various information needed for management; help clarify management goals; screen problems; establish various evaluation models; develop a series of alternative solutions and be able to evaluate and screen various solutions; use artificial intelligence to make analysis and comparison of information; and provide reasonable and effective management solutions for managers. As an emerging information technology industry, student evaluation management system has advantages that other industries cannot match. It can greatly reduce the work pressure of counselors engaged in various low-level information processing and analysis, allowing counselors to focus more on the work that requires the most management wisdom and experience, effectively solving the problem of working blindly but getting half the result with twice the effort.

The low efficiency of student management and evaluation, which is detached from reality and lacks scientific rationality, is a common phenomenon in today's Sino-foreign cooperative schools, and the lack of strong support for all aspects of student management and evaluation activities seriously limits the depth of cooperative school management reform. The data mining technology can now be applied to the management of counselors, which has to be said to be a forward-looking and far-sighted change activity

for Sino-foreign cooperative universities. Applying data mining technology for student management evaluation system to the current student management in universities not only makes it easier for counselors to cope with various work tasks but, more importantly, counselors will get various unexpected gains and discoveries in this mining process.

Although big data mining technology has so many advantages in the application of counselor management in Sino-foreign cooperative universities, there are still many shortcomings that need to be improved. These include flaws in data management, insufficient attention to big data technology in schools, and also inadequate mathematical modeling techniques [19]. At the same time, the data among university systems should be reasonably standardized and unified, and standardized requirements should be formulated to prevent the occurrence of the problem of poor data circulation and inability to share among departments when the big data mining technology is used to analyze the data. In addition, for the processing of complex data types, it is unrealistic for universities to expect one system to mine all types of data due to the diversity of data types and different objectives of mining, which requires universities to build a targeted data mining system for different types of data. In addition, for data stored in databases, the data may reflect situations such as noise exceptions or incomplete data objects. These objects may mess up the analysis process and cause the knowledge model constructed from the data to be incompatible [20]. This requires universities to have cleanup methods for dealing with data noise and incomplete data as well as outsider mining methods for discovering and analyzing exceptions.

5. Conclusion

In summary, with the booming development of Chinese-foreign cooperative schools, the expectations of all parties in the society for the schools are getting higher and higher. And the various aspects of the ideological existence of Sino-foreign cooperative schools have challenged the management requirements of counselors in various aspects, which makes it difficult for universities to carry out reasonable and effective management of students according to traditional methods. At this time, an emerging technology can be used to discover the hidden patterns and information in the data through data mining to provide effective support and assistance to the management.

This article verifies through research that data mining technology is of great value to counselors in their management work. It is the result of human wisdom and practice, breaking the inherent thinking of traditional teaching and providing directions and methods for building models that are impossible to obtain in traditional teaching. It can provide scientific decision-making solutions for counselors of Sino-foreign cooperative schools and reference models for school education. Applying this technique to the management of counselors is of great significance both for the counselors themselves and for the school as well as for other types of universities to learn from and refer to.

In view of the limitation of research time and personal ability, this article has some incomplete points. For the application of big data mining technology in the field of Sino-foreign cooperative education, there are still many issues to be further explored.

Data Availability

The labeled dataset that supports the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares no conflicts of interest.

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References

[1] L. I. Zhipeng, "The innovation strategy of Chinese-foreign cooperation in running schools in China's double first-class universities," *International Journal of Education and Teaching Research*, vol. 3, no. 2, 2022.

[2] Z. Chen, "Learning from and breaking through: the current situation, problems and countermeasures of sino-foreign cooperation in higher education," *International Journal of Social Science and Education Research*, vol. 5, no. 2, 2022.

[3] Y. Chen, "Students' Learning Experiences in the Foundation Year of a Sino-Foreign Joint University," in *Proceedings of the 2021 4th International Conference on Humanities Education and Social Sciences (ICHESS 2021)*, Chongqing, China, October 2022.

[4] Q. Wang, "Strategic Analysis of Sino-Foreign Higher Education Cooperative Universities Based on SWOT Model," in *Proceedings of the 2021 4th International Conference on Humanities Education and Social Sciences (ICHESS 2021)*, Chongqing, China, October 2022.

[5] W. Yang, "The present situation, problems and countermeasures concerning sino-foreign joint education programs in higher education in the new era," *Scientific Journal Of Humanities and Social Sciences*, vol. 3, no. 12, 2021.

[6] Z. Li, "A brief analysis of the ways to improve the quality of foreign teachers' specialized courses for junior college students in sino-foreign cooperation," *International Journal of Higher Education Teaching Theory*, vol. 2, no. 4, 2021.

[7] X. Zhu and A. Feng, "ICC nurturing strategies in the context of sino-foreign institutes," *Theory and Practice in Language Studies*, vol. 11, no. 9, pp. 1072–1079, 2021.

[8] Q. Wang and Y. Yin, "Analysis on the cultivation path of national security awareness of the students of sino-foreign cooperative education major in the new era," *International Journal of Higher Education Teaching Theory*, vol. 2, no. 2, 2021.

[9] X. Wang and Y. Yin, "A study on student management of sino-foreign cooperative education majors from the

perspective of ideology security," *International Journal of Social Sciences in Universities*, vol. 4, no. 2, 2021.

[10] C. Zhang and L. Liu, "Investigation on "global competence" of college students and exploration of training path based on sino-foreign joint programs," *Journal of Simulation*, vol. 9, no. 2, 2021.

[11] R. Liu, "Research on English teaching design of Chinese-foreign cooperative education in colleges and universities," *International Journal of Educational Management*, vol. 6, no. 1, 2021.

[12] C. Pan, "The introduction of international education capital to Chinese-foreign cooperation in running schools under the higher education internationalisation perspective," *International Journal of Educational Technology*, vol. 2, no. 1, 2021.

[13] L. Ou, "Research on the teaching mode of bilingual computer courses for Chinese-foreign cooperation in running schools programme," *International Journal of Higher Education Teaching Theory*, vol. 2, no. 1, 2021.

[14] Y. Li, J. Qian, and X. Rao, "Intercultural adaptation of undergraduate students in Germany under the framework of sino-foreign cooperative education: an empirical study," *OALib*, vol. 08, no. 02, pp. 1–11, 2021.

[15] Y. Wu, Z. Tao, and G. Wang, "A study on the evaluation of foreign teachers' classroom teaching quality of sino-foreign cooperation in running schools from the perspective of new engineering," *International Journal of Frontiers in Sociology*, vol. 3, no. 2, 2021.

[16] R. Yu and C. Dong, "Means to Elevate Employment Competence in Sino-Foreign Cooperative Education," in *Proceedings of the 2021 International Conference on Transformations and Innovations in Business and Education (ICTIBE 2021)*, Nanjing, China, June 2021.

[17] Y. Zhou, "Exploration and Countermeasures of Problems Existing in Sino-Foreign Cooperation in Running Schools under Higher Education," in *Proceedings of the 2021 International Conference on Transformations and Innovations in Business and Education (ICTIBE 2021)*, Nanjing, China, June 2021.

[18] Y. Z. Sun, C. U. I. L. Jun, M. A. X. Hua, T. U. X. Wei, Research and Practice of Internationalization of Postgraduate Education under the Perspective of "Chinese-foreign Cooperatively-Run Schools Upgrade Version"" in *Proceedings of the 2021 5th International Seminar on Education, Management and Social Sciences (ISEMSS 2021)*, Chengdu, China, July 2021.

[19] M. Qiao and H. Long, "Situations, Difficulties and Solutions: Reflection on Ideological and Political Construction of Sino-Foreign Cooperative Program Courses in Colleges," in *Proceedings of the 2021 International Conference on Modern Management and Education Research (MMER 2021)*, Shanghai, China, July 2021.

[20] Q. Liu, "Research on the Superior Quality Education Resources Introduction under the Chinese-foreign Cooperative School-Running Mode," in *2nd International Conference on Education Studies: Experience and Innovation (ICESEI 2021)*, Moscow, Russia, November 2021.