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Research Article

Teaching Practice of Engineering Management Course for Engineering Education Certification under Background of Artificial Intelligence

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With the advancement of China's industrial construction, the field of engineering management has also attracted more attention. However, China's engineering management major is currently in a growing stage due to the issue of the opening years, and the teaching and practice setting of each course is also in an immature stage, which makes China's engineering management majors present more and more problems. The truancy rate has been increasing year by year, the students' dominant position in the class has become objectified, and their trust in teachers has decreased. Students' learning shows the characteristics of individualization and diversity. Higher requirements are put forward for teachers' teaching quality, and schools lack an effective supervision mechanism. In order to solve these problems better, it is imperative to reform and innovate the course teaching of engineering management majors. The core of engineering education accreditation is to confirm that engineering graduates meet established quality standards recognized by the industry. It is a unique method to test whether the course teaching of engineering management majors is qualified and attracts many scholars to discuss it. Engineering education accreditation has attracted many scholars to discuss it because it is a unique means to test the qualifications of engineering management students' course teaching. This study was based on an in-depth exploration of the teaching practice of engineering management courses and combines artificial intelligence with an engineering education certification. Through the research and analysis of colleges and universities, the research finally showed that the engineering management professional course teaching of engineering education certification under the background of artificial intelligence can promote the attendance of students in school by about 20%. The achievement of course teaching objectives has increased by about 13% and the comprehensive ability level of graduates has increased by about 8%. It improved the overall level of students and the teaching quality and efficiency of engineering management courses and also promoted the development of college education so that today's engineering management graduates can better meet the needs of today's society.

1. Introduction

With the development of China's market economy, the traditional mode and method in the field of engineering management today is the general contracting mode of engineering, that is, the integrated mode of design, procurement, and construction. After the project decision-making stage, starting from the design, and after bidding, the engineering company is entrusted to carry out general contracting for design, procurement, and construction. This model has been difficult to meet the needs of the rapid development of the current construction industry. A more complete and effective method has become an urgent need for the implementation of the whole process management of engineering projects. However, due to the late establishment of engineering management majors in colleges and universities, the engineering management major curriculum system has been continuously explored and improved. In today's boom in artificial intelligence, artificial intelligence + education have also attracted many scholars to study it. At the same time, engineering education certification, as an important way of college education and teaching reform, is highly praised by many scholars. Therefore, we have reason to believe that the teaching practice of engineering management courses based on engineering education certification under the background of artificial intelligence is conducive to promoting the development of engineering management teaching in colleges and universities and the training of engineering management talents. Finally, it would meet the needs of the current engineering management field for compound talents who understand technology and management and have both economic and legal backgrounds.

For the analysis of the teaching practice of engineering management courses of engineering education certification under the background of artificial intelligence, various scholars have carried out research on it at different levels. Dong mainly studied the reform of digital image processing courses under engineering education certification. He showed that the three core concepts certified by engineering education can be applied to the teaching reform of digital image processing, and the teaching effect can be significantly improved through this teaching reform [1]. Wang and Fan mainly studied the concept and practice of engineering education certification for mechanical majors in local colleges and universities. His introduction to the background, requirements, and procedures of engineering education professional program certification showed the necessity and urgency of engineering education professional program certification in general colleges and universities [2]. Zhang and Huang mainly studied the international comparison of environmental engineering professional degree education accreditation. Their systematically sorted out and analyzed the content of the professional certification standards for environmental engineering education, certification procedures, and the relationship between certification and engineer qualifications [3]. Jia et al. mainly studied the continuous improvement strategy of automation majors under the background of engineering education certification. They analyzed the development status and future orientation of the automation major, indicating that the engineering education certification is conducive to promoting the functionalization of engineering and the internationalization of the construction of automation majors. It pointed out the direction for the future development of the automation profession [4]. The research of these scholars is limited. Their research focuses on the importance of professional accreditation in engineering education and accreditation standards. The research direction tends to be more specific to the analysis of the importance of engineering education professional certification, but the analysis of its teaching practice is rarely involved and discussed. Therefore, some scholars have turned their research direction to the current hot artificial intelligence and conducted in-depth research on it. Ehsan et al. research on how AI context affected perceptions of AI explanations and their hands-on work has taken an important step forward in advancing human-centered multivariate interpretable AI discourses [5]. Li et al. mainly studied the spoken English teaching system based on virtual reality under the background of artificial intelligence and demonstrated the spoken English training system based on artificial intelligence and virtual reality technology. He made oral English teaching meet the requirements of the times, and it can improve the efficiency of oral English training [6]. Rongpeng et al. mainly studied the fusion of cellular networks and AI and speculated that AI-enhanced 5 G cellular networks would make the acclaimed ICT a reality [7]. Hassabis et al. mainly studied neuroscience-inspired artificial intelligence and showed that recent advances in artificial intelligence would be the key to driving future research in both neuroscience and artificial intelligence [8]. From these scholars' research on artificial intelligence, it can be seen that the application field of artificial intelligence is extremely extensive and has achieved very good results, and it is mostly used in manufacturing, financial industry, transportation, and other fields and has achieved very good results in medicine, and there is also some research on its use in the field of education. There is very little research on the teaching practice analysis of engineering management courses for engineering education certification under artificial intelligence. This means that the teaching practice analysis of engineering management courses for engineering education certification under the background of artificial intelligence is a relatively new field, which needs to be explored and studied.

Based on the in-depth research on engineering education certification under the background of artificial intelligence, the research showed that engineering education certification under the background of artificial intelligence was conducive to promoting the improvement of the teaching quality and efficiency of engineering management courses. For today's colleges and universities, engineering education certification programs are also extremely necessary, which can promote the development of college education and have practical significance for the construction of colleges and universities today.

2. Teaching of Engineering Education Accredited Engineering Management Courses

In order to explore the teaching of engineering management courses for engineering education certification in the context of artificial intelligence, it is first necessary to introduce its related concepts and information.

2.1. Project Management. The teaching of project management is as follows.

2.1.1. Overview of Engineering Management Major. In the United States, engineering management is called "construction engineering management" [9]. It is generally affiliated with the School of Engineering, and its teaching focuses on the whole process of engineering projects, including design, budgeting, procurement, construction, operation, and maintenance, and has a bachelor's degree in engineering management. China's engineering management undergraduate colleges are mostly based on business schools, management departments, and engineering colleges [10]. Because foreign universities do not have a unified professional direction, the differences between universities also show their own characteristics, showing more diversified characteristics. In the engineering management courses of foreign universities, engineering technology courses account for a large proportion, more than half, of which the proportion of practice and internship is also large, and the curriculum system pays more attention to the combination with future professional qualifications. Under the guidance of the Ministry of Education, the engineering management major in China cultivates certain basic knowledge in management, economics, civil engineering technology, and law. It is a senior compound talent who can manage the whole process in the field of world engineering project construction. From the perspective of curriculum design and talent training methods, the engineering management major mainly covers four professional subjects including management, finance, technology, and law. The curriculum design mainly includes public basic courses, professional basic courses, and subject-oriented basic courses. It is interspersed with curriculum design, practical education, and practice inside and outside the school, and finally, it carries out a graduation design (or thesis). In contrast, the engineering management majors in many Chinese universities either fail to establish their advantages or have no obvious characteristic advantages. Most of the talent training projects are based on classroom teaching, and teachers have few scientific research projects, and it is even difficult to create a platform for undergraduates to experiment and learn.

2.1.2. Construction of Engineering Management Courses. The curriculum is the core of teaching and the key to cultivating students, and the establishment of a curriculum and the establishment of a knowledge system is the specific embodiment of the educational purpose of students [11]. In order to promote the development of engineering management majors, we can start from four aspects, and through a series of effective measures, the teaching quality of engineering management majors can be continuously improved [12]. First, it can optimize the knowledge structure and build a "broad, fine, and rich" curriculum system. Schools should optimize the curriculum system and knowledge structure as a whole and attach importance to practice and innovation. Public basic courses and some basic courses can be set up by subject categories, while professional basic courses and professional courses can be carried out according to different fields. Second, the investment in education funds can be increased, and the reform of curriculum and teaching content can be promoted. Universities should vigorously promote the reform of curriculum and teaching content, explore the cultivation of knowledge and ability, reconstruct the curriculum system, update teaching content, and build a series of courses. Third, it is necessary to strengthen teacher incentives and strengthen teacher training. In terms of teacher team building, it is necessary to strengthen the training of teachers in public courses and basic courses. In the promotion of professional titles, "teaching and research sections" can be set up and guided by excellent teachers. Fourth, we can strengthen technical support and strictly review the quality of submitted materials. Schools can set up a separate server on the "Quality Course" website to ensure the normal operation of the website and teaching videos.

2.1.3. Teaching Reform of Engineering Management Major Courses. With the rapid development of China's engineering construction industry, undergraduate education in engineering management has also been a good reference. However, compared with similar majors, the engineering management major is set up for a shorter period of time, and the degree of professional development is not high. The teaching of engineering management major is not perfect enough, the understanding and positioning of engineering management major are not accurate enough, and there are some problems in professional direction, curriculum system setting, and direction. It is necessary not only to meet the requirements of professional certification and evaluation but also to maintain the professional characteristics of the faculty of the Department of Engineering Management. In addition to improving the curriculum, sand table simulation, simulation software, etc., it also needs to reform the curriculum and graduation thesis.

It not only enables students to have a better understanding of applied professional knowledge but also integrates the knowledge they have learned, thereby enhancing their scientific research and innovation capabilities. Due to the advantages of qualitative and quantitative methods (short time, low cost, more practical, and quantitative analysis method is to establish mathematical model based on statistical data, which is more scientific), the dissertations of graduates majoring in engineering management are carried out from both quantitative and qualitative aspects, which are proposed for practical problems. On the whole, students feel that the graduation project can integrate the knowledge and skills learned in school so that they can better grasp and apply what they have learned, thereby enhancing their problem-solving ability and teamwork ability.

With the reform of graduation design, course content can also be adjusted accordingly. Based on the national excellent course "Project Cost Planning and Control," combined with the design of the existing courses, a relatively complete project cost management system has been constructed. The promulgation of the curriculum design reform plan has certain reference significance for other disciplines on the basis of modularization, clustering, and other fields. At the same time, it can also promote the improvement of students' practical ability.

2.1.4. Importance of Teaching Reform of Engineering Management Courses. Facing the complex and changing international economic environment, it is necessary to cultivate better management talents. In the new century, in the context of economic globalization, engineering management is an important leader in the construction industry. In recent years, China's engineering management major has gradually formed a school-running concept centered on research-based undergraduate education so that its advantages in discipline and scientific research have been fully utilized. It is necessary to adhere to the student-oriented approach and focus on cultivating students' international vision and thinking ability. With high-level projects and horizontal projects serving to teach, the teaching content is more abundant and the teaching quality is improved. It is necessary to pay attention to the basics, focus on practice, focus on engineering and scientific research, and strengthen students' innovative consciousness and practical ability [13].

2.2. Engineering Education Certification. The teaching of engineering education certification is as follows.

2.2.1. Overview of Engineering Education Accreditation. Engineering Education Accreditation (also known as Engineering Education Professional Accreditation or Professional Accreditation) is a special accreditation for the engineering and technical education community [14]. It is relative to the accreditation of ordinary schools. Different from the general accreditation of schools, engineering professional accreditation mainly provides quality assurance for engineering professionals trained by higher education institutions to practice in the professional field. It is generally a professional accreditation by professional committees and engineering training institutions for engineering majors offered through higher education institutions offering certificate programs. It is a major part of the accreditation of engineering higher education. The Engineering Education Professional Accreditation is designed to enhance the training of engineering personnel in higher education organizations to meet the basic needs of the professional world. It is a professional accreditation carried out by professional accreditation organizations such as engineering associations for engineering majors provided by higher education organizations that submit applications for accreditation. In nature, engineering education certification is a qualification evaluation, not a merit evaluation because it is a test of whether engineering educators meet minimum standards of quality. The main purpose of the professional certification of engineering teachers is to evaluate the qualification of engineering personnel to meet the specified quality standards. At the same time, it is necessary to provide quality assurance for Chinese engineering personnel to go to the international engineering education field. It improves the continuous improvement of China's engineering teaching system, thereby improving the service quality of China's engineering teachers.

2.2.2. Features of Engineering Education Certification. With China's formal accession to the "Washington Accord," professional certification work in China has become increasingly popular. To ensure its smooth implementation, China's engineering education practice has established a relatively complete quality assurance system. Under the guidance of result-oriented teaching ideas, the school adheres to the student-oriented, with training objectives, graduation requirements, and curriculum system quality assurance as the core under the guidance of the seven standards of the "Engineering Education Accreditation Standards." It provides perfect guarantee measures for engineering education practice and forms a relatively complete professional education quality guarantee system, which has distinct characteristics and practical effects [15]. First, it is necessary to stipulate that vocational education should have a certain basis. Clear target requirements enable engineering education to be implemented. Judging from the actual work in China, engineering education has clear regulations in terms of training objectives, curriculum systems, and graduation requirements. Under such demands, the practice of engineering education has a clearer direction. Second, a sound evaluation system ensures the quality of personnel training. Under the environment of certification, engineering education itself has a relatively complete evaluation system, and a relatively complete evaluation system has been carried out in terms of training objectives, curriculum system, and graduation conditions. Especially for the whole teaching link of engineering education, it has established a relatively complete quality evaluation system. This assessment includes both internal and external assessments within the school. Third, through the perfect certification process, the smooth progress of the certificate is guaranteed. China's engineering education certification system has a complete certification process and clear norms, which have a certain guiding role in improving the teaching quality of higher vocational colleges.

2.3. Artificial Intelligence. The teaching of artificial intelligence is as follows.

2.3.1. Overview of Artificial Intelligence. Artificial intelligence (artificial intelligence is abbreviated as AI) [16]. Although artificial intelligence contains intelligence, it is not really intelligent and has no real body. Artificial intelligence generally relies on computers to build artificial intelligence to simulate human perception, learning, reasoning, and other abilities. Some scholars say that artificial intelligence relies on machines to do things that require human intelligence. Some scholars also said that the most important thing about artificial intelligence is that it can not only allow machines to imitate humans but also make machines surpass the capabilities of humans, thereby helping humans to do tasks that require brainpower and intelligence. Some scholars believe that artificial intelligence is a discipline that allows computers to express human intelligence by completing various tasks. From the viewpoints of these scholars, it can be seen that the essence of artificial intelligence is to rely on computers to imitate human intelligence so that it can help people perform part of their mental work. These remarks clearly show that, for artificial intelligence, most people think that it is the product of human technology and the embodiment of human intelligence. Although it can perform some intellectual activities in place of human beings, it cannot surpass human beings. The artificial intelligence mentioned in this study is more of all kinds of intelligent devices and applications created based on artificial intelligence.

Traditional AI problems (or goals) include reasoning, knowledge representation, planning, learning, natural language processing, perceiving, moving, and controlling objects. Ordinary intelligence is a long-term goal in this regard. Methods include statistics, computational intelligence, and traditional symbolic intelligence. Artificial intelligence uses many tools, such as search and mathematical optimization, neural networks, statistics, probability, and economics. In terms of artificial intelligence, it involves computers, information engineering, mathematics, psychology, linguistics, philosophy, and many other aspects. The specific structure of artificial intelligence is shown in Figure 1.

2.3.2. System Classification of Artificial Intelligence. There are three types of AI: analytical, human-inspired, and human-like AI [17]. Analytical AI has only the characteristics that match its cognitive intelligence. On this basis, from the perspective of cognition, the past experience is used to provide a reference for future policy formulation. Artificial intelligence is created by humans and contains intelligence. In addition to cognitive factors, it is also necessary to understand human emotion and incorporate it into decision-making. Humanized AI exhibits various abilities (such as cognitive, emotional, and social intelligence), and it is consciously aware of itself when communicating with others.

2.3.3. Artificial Intelligence Algorithms. Artificial intelligence is generally algorithm-centric. An algorithm is a set of clear instructions, performed by a set of mechanical computers. Complex algorithms are often based on other simpler algorithms. Many AI algorithms can be learned from data; they can improve themselves by learning new heuristics (strategies and "rules of thumb"), or they can write other algorithms themselves. The "learners" described below, such as Bayesian networks, decision trees, and nearest neighbors, can theoretically learn arbitrarily close functions, including mathematical functions that best describe the world. So, students can take every possible hypothesis into account and compare them to the data to get the full knowledge. In fact, it is impossible to take all possibilities into account, which is a kind of "combinatorial explosion," that is, the time required to solve a problem increases exponentially. Much of the research on artificial intelligence is about how to identify and avoid thinking about possibilities that are unlikely to bring benefits. On this basis, the study would introduce an artificial intelligence-based clustering analysis method.

2.3.4. Basic Principle of Cluster. Cluster analysis is one of the most commonly used methods in data mining, which can find unknown objects in a database [18]. The principle of this classification is "like things cluster together." It groups individuals or data objects that meet similar criteria into groups based on the similarity between individuals or data objects. People or data that do not meet the same conditions are divided into different groups, and each group formed by group processing is called a class [19]. The specific cluster analysis process is shown in Figure 2.

The above description expresses the clustering problem by a mathematical formula and can be expressed as follows.

Assuming that the given dataset is $A\{\mathrm{an}|n = 1, 2, \ldots, m\}$, an represents the data object; according to the approximation of each data object between the data, the data of each dataset can be divided into L groups, and let it satisfy

$$\begin{aligned} &C_i | i = \{1, 2, \ldots, l\},\\ &C_i \subseteq A,\\ &C_n \cap C_i = \varnothing,\\ &\bigcup_{n=1}^{l} C_n = A. \end{aligned} \tag{1}$$

This process is clustering; among them, $C_n\,(n = 1, 2, \ldots, n)$ is cluster (class).

It can also be said that the input in the cluster analysis can be expressed by ordinal pairs (b, d) or (b, f).

Among them, b is a group of samples and d, f is the standard of similarity or dissimilarity between cluster samples.

Since the output partition of cluster analysis can be expressed as

$$b = (H_1, H_2, \ldots, H_L), \tag{2}$$

among them, $H_L\,(l = 1, 2, \ldots, P)$ is a subset of b.

The specific formula is expressed as

$$\begin{aligned} &H_1 \bigcup H_2 \bigcup \cdots \bigcup H_l = B,\\ &H_n \cap H_i = \varnothing, \quad n \neq i, \end{aligned} \tag{3}$$

where $H_1, H_2, \ldots, H_L$ is the class.

For example, the center of a class is a node in a multidimensional space, which can represent a class by a set of nodes, or a class by its features.

2.3.5. Cluster Algorithm. Types of data structures in cluster analysis: define g variables to represent j objects. The relational representation of this data structure can be expressed by the $j \times g$ matrix, which can be expressed as

$$\begin{bmatrix} b_{11} & \cdots & b_{1y} & \cdots & b_{1g} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ . b_{n1} & \cdots & b_{ny} & \cdots & b_{ng} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ b_{j1} & \cdots & b_{jy} & \cdots & b_{jg} \end{bmatrix}. \tag{4}$$

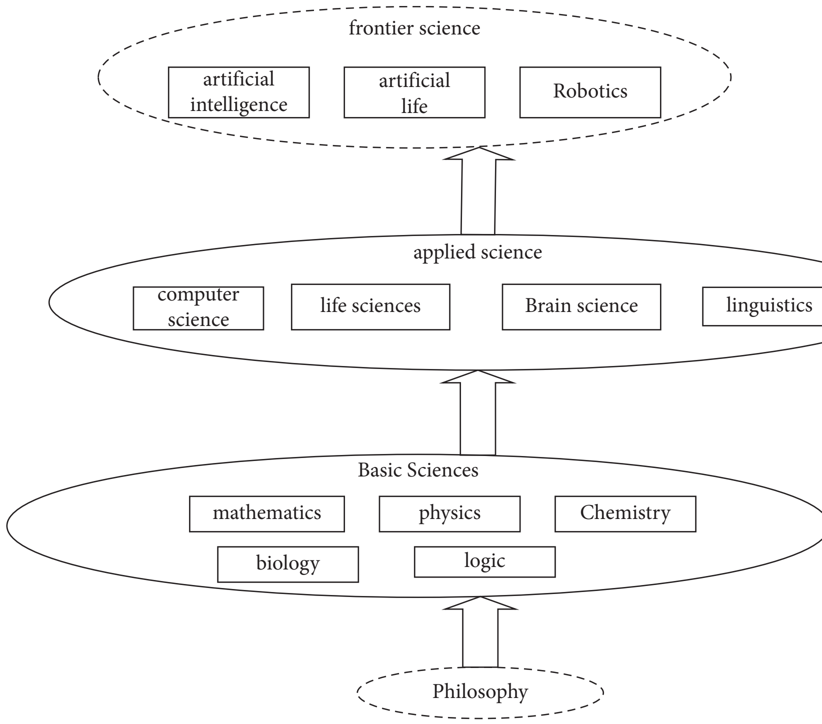

Figure 1: Schematic structure of artificial intelligence.

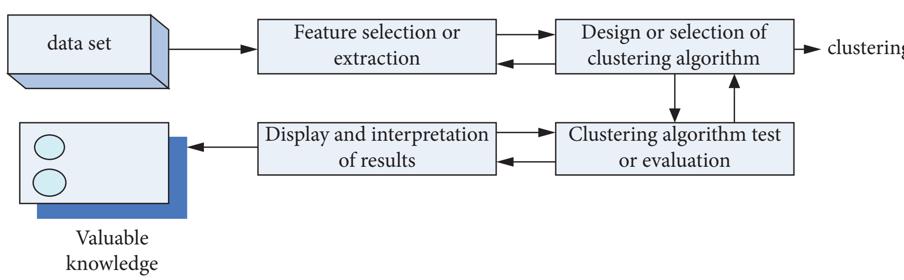

Figure 2: Cluster analysis flowchart.

Similarity measure: the basic concept of cluster analysis (considering the similarity between individuals and data objects, it classifies individuals and data objects that meet the similarity criteria into sets. It reclassifies individuals or data objects that do not meet the similarity criteria into different groups) can be obtained that the main feature of the measurement cluster is "similarity" [20]. The similarity within the class is the highest, and the similarity between the classes is the lowest. When the dissimilarity $t(k, k')$ is used to represent two similar samples k and k', the value of $t(k, k')$ would be large. Once the two are not similar, the value of $t(k, k')$ would be smaller, and the metric of EE and similarity is reflexive, which is expressed as

$$\forall k' k \subset k \forall k', \quad k \in K. \tag{5}$$

In general, the similarity metric for clustering algorithms can be normalized as

$$0 \le t(k, k') \le 1 \ \forall k', \quad k \in K. \tag{6}$$

Under normal circumstances, the selection of the dissimilarity index is higher than the similarity index. Thus, the dissimilarity measure can be expressed by the following formula:

$$d(k', k), \forall k', \quad k \in K. \tag{7}$$

Usually, the variables of the objects discussed are continuous intervals, so the dissimilarity can also be called distance. When k and k' are similar, the distance $d(k, k')$ would be small. Once they are not similar, the $d(k, k')$ distance would be larger.

Here, there are several formulas commonly used to define distances, and this study only introduces the formulas related to defining distances.

Manhattan distance:

$$d(n, i) = |k_{n1} - s_{i1}| + |k_{n2} - k_{i2}| + \cdots + |k_{nx} - k_{ix}|, \tag{8}$$

where $d(n,i)$ is the distance from the data object n to the data object and $(k_{n1}, k_{n2}, \ldots, k_{nx})$, $(k_{i1}, k_{i2}, \ldots, k_{ix})$ is the x attributes of data object n to data object i, respectively.

Euclidean distance:

$$d(n,i) = \sqrt{\left|k_{n1} - k_{i1}\right|^2 + \left|k_{n2} - k_{i2}\right|^2 + \cdots + \left|k_{nx} - k_{ix}\right|^2}. \quad (9)$$

Minka's distance:

$$d(n,i) = \left(\left|k_{n1} - k_{i1}\right|^p + \left|k_{n2} - k_{i2}\right|^p + \cdots + \left|k_{nx} - k_{ix}\right|^p\right)^{1/p}, \quad (10)$$

where p is a positive integer.

When p is 1, Minka's distance is the Manhattan distance; when p is 2, Minka's distance is the Euclidean distance.

The clustering algorithm, as a common type of artificial intelligence algorithm, is also one of the most widely used computing methods today. In business, clustering can help market analysts to distinguish different consumer groups from consumer databases. It can also be used as a standalone tool to discover some deep information distributed in the database. At the same time, cluster analysis can also be used as a preprocessing step for other analysis algorithms in data mining algorithms. It has achieved remarkable results in many fields. This section introduces the concepts, principles, and related technologies of clustering algorithms and focuses on describing the relevant formulas of clustering algorithms. It provides an empirical theoretical basis for the analysis of the teaching practice of engineering management courses of engineering education certification based on artificial intelligence background and clustering algorithm analysis [21, 22].

3. Course Teaching under Engineering Education Certification

In order to study the application of an engineering management major in an artificial intelligence environment, this paper studies the practice of an engineering management major [23, 24].

In order to analyze the teaching practice of engineering management courses based on engineering education certification in the context of artificial intelligence, we designed an experiment to empirically explore this. In order to better understand and grasp the current teaching situation of engineering management majors, this study conducts a survey on 2018–2021 undergraduates majoring in engineering management from the aspects of survey content, survey method, and survey scope based on statistical principles [25].

3.1. Objects and Survey Content. This research mainly selects two local colleges and universities with the same teacher rankings, School A and School B. School A uses the traditional engineering education certification course teaching method to teach students courses. School B conducts course teaching with the teaching method of engineering education certification under the background of artificial intelligence. We conducted research on students from both schools. The content of the questionnaire consists of three parts. The first part is the age, gender, and grade of the subjects. The second part is the investigation content. The third part is the work performance of college graduates under the two teaching modes and the evaluation of graduates by employers. The survey contents include attendance rate, teaching method recognition, classroom teaching satisfaction, and class attendance rate.

A survey of student attendance was conducted to understand the attendance of engineering management students, as well as reasons for absenteeism and learning attitudes. The survey of teaching identity is to clarify students' understanding of teachers' teaching methods and whether teachers can stimulate students' interest in learning. The goal of the classroom teaching satisfaction survey is to comprehensively evaluate the quality of teachers' educational services, including the reasons for their satisfaction and dissatisfaction, and ways to improve their expectations. Therefore, this survey requires both "learning" and "teaching" in order to comprehensively and effectively reflects the current teaching status of engineering management majors.

3.2. Statistics of Survey Results. The two schools each distributed 300 copies of the questionnaire: school A returned 278 copies, school B returned 282 copies, school A had 15 invalid questionnaires, and school B had 6 invalid questionnaires. The effective rate of the questionnaire in school A was 87.67%, and the effective rate of the questionnaire in school B was 92%. Among the 278 questionnaires, 188 were boys and 90 were girls in school A; 189 were boys and 93 were girls in 282 schools in B. The specific survey sample numbers of students of different grades and the distribution of sample numbers are shown in Tables 1 and 2.

3.2.1. Student Truancy Behavior. After in-depth calculation and data analysis of the questionnaire, it can be known that there are great differences among the research subjects of different age groups in the student's class attendance rate, classroom teaching identity, and classroom satisfaction. Figure 3 is a comparison chart of whether students from the two schools have skipped classes.

As can be seen from Figure 3, there are only 48 students who do not skip classes in School A, accounting for only about 17% of the students surveyed. This shows that there are many truancy behaviors among students in school A who use traditional teaching methods. Although most students only skip classes occasionally, it can also show from the side that skipping classes has become a common phenomenon. To a certain extent, it can reflect that there are problems in the traditional course teaching of engineering management majors. In school B, 101 students did not skip classes with the teaching method under the background of artificial intelligence, accounting for about 36% of the students surveyed. School B students skip classes less frequently, and only a few skip classes more frequently. This shows that the attendance rate of students in school B is much higher than that of school A in engineering management major.

Table 1: Gender distribution of samples.

School	Gender	Number	Proportion (%)	Total samples
A	Sample number of boys	188	67.62	278
	Sample number of girls	90	32.38	
B	Sample number of boys	189	67.02	282
	Sample number of girls	93	32.98	

Table 2: Sample grade distribution.

School	Grade	Freshman	Sophomore	Junior	Senior	Total samples
A	Number of samples	66	70	65	77	278
	Proportion (%)	23.74	25.18	23.38	27.70	100
B	Number of samples	73	70	64	75	282
	Proportion (%)	25.88	24.82	22.70	26.60	100

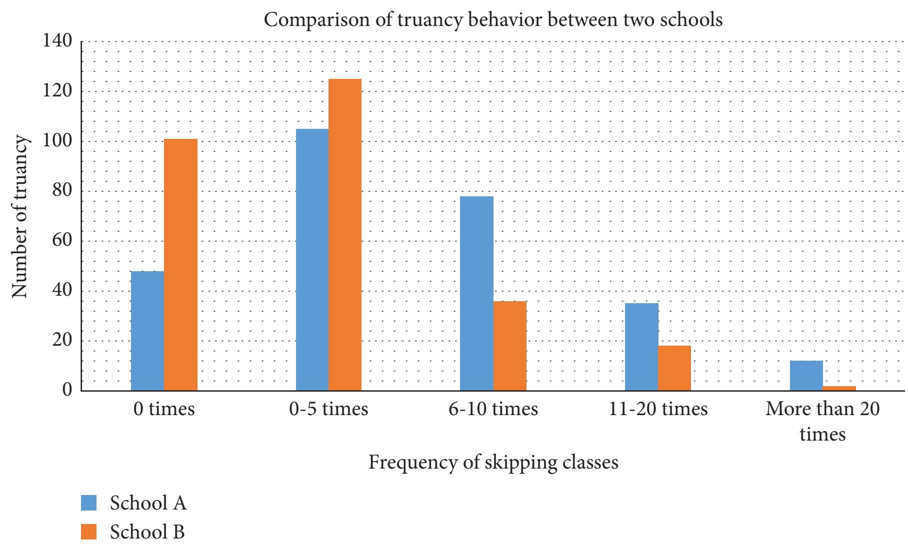

Figure 3: Comparison of truancy frequency between school A and school B.

In view of the fact that the attendance rate of students in school A is much lower than that in school B, we have investigated the truancy behavior of students in school A and the reasons why students in school B do not skip class. The specific results are shown in Tables 3 and Table 4.

From Table 3, it can be seen that most of the reasons why students in school A choose to skip classes are because they think that they cannot learn anything in the course or the teaching methods of the teachers do not like it. These two kinds of students account for 32.01% and 32.37% of the total, respectively. This means that most of the school A students do not like the courses and teaching methods of the major. To a certain extent, this reflects the learning attitude of traditional engineering management students and the problems existing in the course teaching field.

It can be seen from Table 4 that most of the reasons why students in school B do not skip classes believe that knowledge is useful to them, the teaching method is interesting, and the teaching content is novel. These three types of students account for 26.6%, 26.95%, and 26.24% of the total, respectively, which show that the students of school B are more satisfied with the teaching method of the engineering management major of engineering education certification under the improved artificial intelligence background. In this course teaching mode, the attendance rate of students has increased by about 20%, and the attendance rate of students has been greatly improved. Teaching method identity and classroom teaching satisfaction are high. Students can really learn knowledge, be attracted by the courses, meet the needs of students, and ultimately develop engineering management students to a higher quality.

3.2.2. Test Situation of Students' Professional Courses. In order to analyze the learning situation of the students in the two universities, this study evaluates the achievement of the course teaching objectives of the third-year students majoring in engineering management in the two universities, that is, the course achievement test. This study evaluates the professional courses of each student participating in the survey and uses the course scores to

Table 3: Investigation on the causes of students' truancy in school A.

Reason	Number of people	Percentage (%)	Cumulative percentage (%)
Cannot learn anything	89	32.01	32.01
Do not like teachers	18	6.47	38.48
Dislike teaching methods	90	32.37	70.85
The teaching content is too old	50	17.99	88.84
Too inefficient	18	6.47	95.31
Other	13	4.69	100
Total	278	100	100

Table 4: Investigation of students' nontruancy behavior in school B.

Reason	Number of people	Percentage (%)	Cumulative percentage (%)
Knowledge is useful to oneself	75	26.60	26.60
Interesting teaching methods	76	26.95	53.55
Get good results	42	14.90	68.45
Novel teaching content	74	26.24	94.69
Other	15	5.31	100
Total	282	100	100

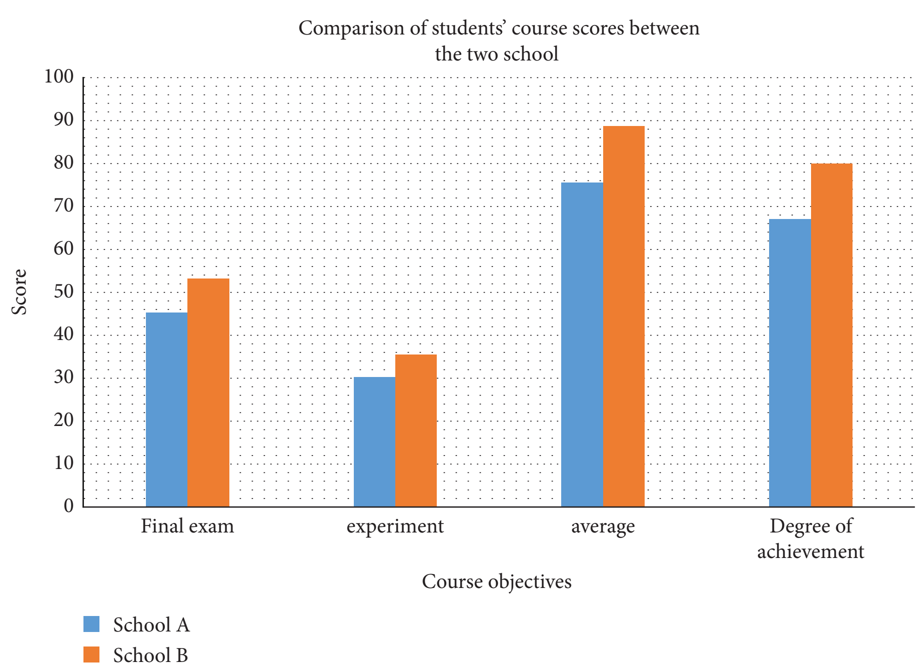

Figure 4: Comparison of professional courses of students in the two universities.

analyze the achievement of professional courses for students in the two schools under the two methods. The specific situation is shown in Figure 4.

It can be seen from Figure 4 that the students of school A are lower than the students of school B in terms of final grades of professional courses, in-class experiments, or overall average scores. This means that, for students majoring in engineering management, the curriculum mastery of students in school A is much lower than that of students in school B. For the final degree of achievement of the course objectives, there are only 67 students in School A. The number of students in school B is 80. The overall mastery of the teaching knowledge of the course is improved by 13% in school B compared with school A. This shows that the engineering management course teaching of engineering education certification under the background of artificial intelligence is beneficial to students to better grasp the knowledge learned in the semester.

3.2.3. Unit's Evaluation of School's Graduate Internship Students. In addition to the statistical analysis of students' attendance and the achievement of course teaching, the last survey we chose is the unit's evaluation of the internship-

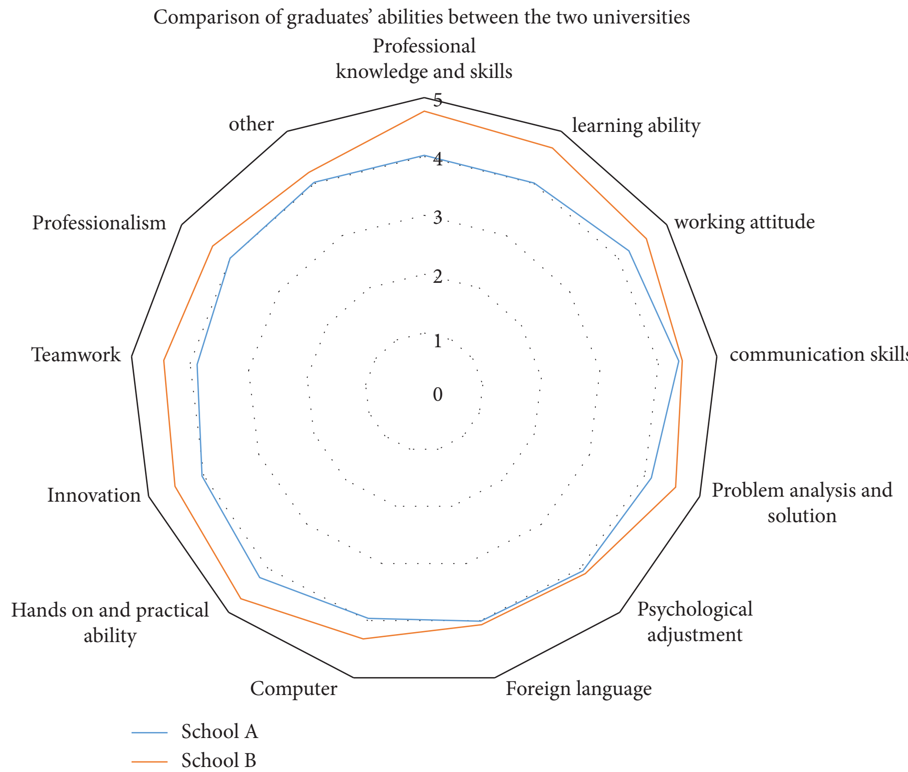

Figure 5: Evaluation of the unit on the internship of graduates from the two universities.

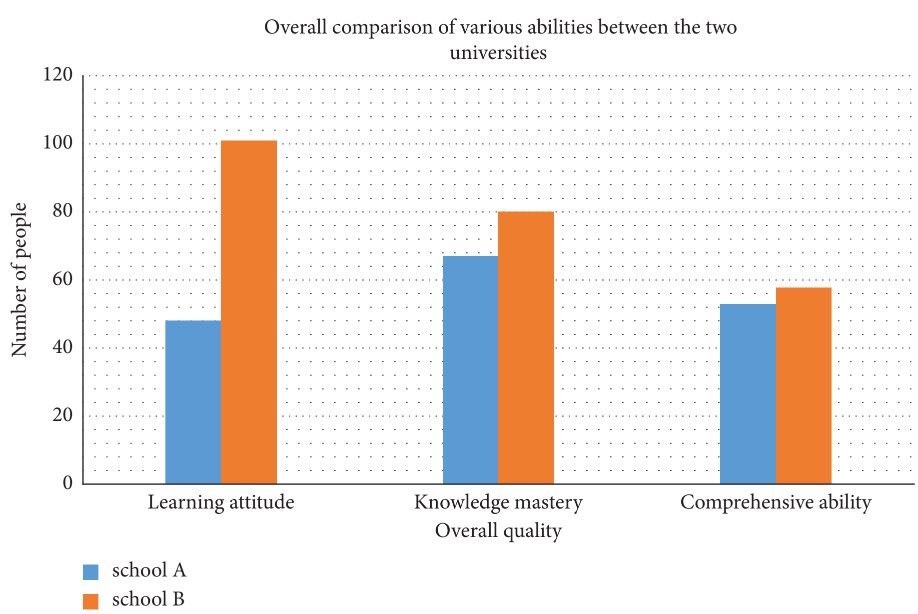

Figure 6: Learning ability comparison.

related situation of senior graduates. The specific evaluation situation is shown in Figure 5.

It can be seen from Figure 5 that there is still a big difference in the evaluation of various abilities of the graduates of the two schools. The evaluation of the senior students of school A is basically around 4 by the employing unit; the evaluation of senior students of school B is basically above 4, and some are about to approach 5. This shows that the overall ability level and quality of students in school B are better than those in school A. Only in terms of foreign language level and communication skills, the overall situation of students in the two schools is similar. In terms of professional knowledge and skills, willingness to learn, innovation ability, and teamwork ability, the students of school B are much higher than the students of school A by about 0.5 points. This shows that the teaching of engineering management courses based on engineering education certification in the context of artificial intelligence is helping to improve students' abilities, which means that students can better adapt to social needs when they graduate and face work.

It can be seen from the above that, compared with school A based on traditional engineering management courses, the students of school B based on the background of artificial intelligence would have more outstanding abilities in all aspects. The details are shown in Figure 6.

It can be seen from Figure 6 that students in school B have a better learning attitude than students in school A, and the student attendance rate has increased by about 20 points. For the mastery of course teaching knowledge, the students of school B are also better than those of school A, and the degree of achievement of the teaching standard of the course has increased by about 13 points. As for the comprehensive ability level of the students after graduation, the students of school B have improved by about 8 points compared with the students of school A. This shows that engineering management students certified in engineering teaching under the background of artificial intelligence are at a higher overall level than students under the original traditional course teaching. It can not only promote the improvement of the teaching quality and efficiency of engineering management courses but also promote the development of college education and can also better meet the needs of today's engineering management for compound talents.

4. Conclusion

At the same time, the development of the market economy has promoted the development of China's engineering management, and at the same time, it has put forward higher requirements for talents in engineering management. This study focuses on the teaching practice of engineering management professional courses for engineering education certification under the background of artificial intelligence. First, a brief description of the research background of the study, then a brief overview of the previous research by scholars, and then an overview of the related concepts and algorithms of the study are given. Finally, through experimental investigation and analysis, the research shows that the teaching practice of engineering management professional courses of engineering teaching certification under the background of artificial intelligence is more favorable and more in line with the current development needs. It can promote the improvement of the teaching quality and efficiency of engineering management courses and, at the same time, make the current engineering management graduates more in line with the needs of the current engineering management field for compound talents. However, there are still shortcomings in this study. This research is relatively lacking at the microlevel. Therefore, future research can pay more attention to the microlevel and focus on the specific teaching curriculum design and implementation. At the same time, the improvement of the engineering management profession in the future is the general trend, which can be achieved by establishing a sound institutional system. In particular, a more in-depth discussion on the division of personnel responsibilities in the curriculum reform would become an important direction for the reform of continuing education in the future.

Data Availability

No data were used to support the findings of the study.

Conflicts of Interest

The authors state that there are no conflicts of interest.

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References

[1] J. Dong, "Discussion on curriculum reform of digital image processing under the certification of engineering education," *Open Journal of Social Sciences*, vol. 10, no. 1, pp. 8–12, 2022.

[2] H. Wang and X. Fan, "Conception and practice of engineering education certification for mechanical majors in local colleges and universities," *Journal of Higher Education*, vol. 8, no. 5, pp. 227–230, 2017.

[3] Y. Zhang and Y. Huang, "International comparison of professional degree education certification in environmental engineering," *IOP Conference Series: Materials Science and Engineering*, vol. 562, no. 1, pp. 012104–012114, 2019.

[4] H. M. Jia, J. W. Zhang, and W. U. Di, "Research on continuous improvement strategies of automation specialty under background of engineering education certification," *Sci-tech Innovation and Productivity*, vol. 18, no. 9, pp. 119–123, 2018.

[5] U. Ehsan, S. Passi, and Q. V. Liao, "The who in explainable AI: how AI background shapes perceptions of AI explanations," vol. 256, no. 8, pp. 248-249, 2021.

[6] X. Li, Y. Xie, and T. Liu, "Research on oral english teaching system based on VR in the background of AI," *Journal of Physics: Conference Series*, vol. 1550, no. 2, pp. 022031–31, 2020.

[7] R. Rongpeng, Z. Zhao, X. Zhou et al., "Intelligent 5 G: when cellular networks meet artificial intelligence," *IEEE Wireless Communications*, vol. 24, no. 5, pp. 175–183, 2017.

[8] D. Hassabis, D. Kumaran, C. Summerfield, and M. Botvinick, "Neuroscience-inspired artificial intelligence," *Neuron*, vol. 95, no. 2, pp. 245–258, 2017.

[9] T. Han, "RETRACTED: research on the teaching reform path of operational research course of engineering management major based on computer technology," *Journal of Physics: Conference Series*, vol. 1744, no. 3, pp. 032238–38, 2021.

[10] K. Georgousoglou, Y. Mouzakitis, and E. D. Adamides, "On the contribution of risk management plans to municipal solid waste management: evidence from a major Greek municipality," *IOP Conference Series: Earth and Environmental Science*, vol. 899, no. 1, pp. 012071–12117, 2021.

[11] R. Cox, "Improvements in college teaching in the United Kingdom (comparative approaches to higher education: curriculum, teaching and innovations in an age of financial difficulties: reports of the hiroshima/OECD meetings of experts: part 2: curriculum and teac," *American Economic Review*, vol. 107, no. 10, pp. 79–87, 2017.
[12] W. L. Hsu, Y. S. Chen, Y. C. Shiau, H. L. Liu, and T. Y. Chern, "Curriculum design in construction engineering departments for colleges in taiwan," *Education Sciences*, vol. 9, no. 1, pp. 65–105, 2019.
[13] X. Tang, L. I. Ming, and Z. Wang, "Structural mechanics curriculum at local colleges and universities:an curriculum teaching reform exploration and practice at lishui university," *Journal of Lishui University*, vol. 121, no. 9, pp. 251–256, 2018.
[14] C. Cheng, L. Wu, and S. Wang, "Practical teaching reform of environmental monitoring under the background of engineering education certification and new engineering," *Guangdong Chemical Industry*, vol. 15, no. 6, pp. 8–11, 2019.
[15] H. Ye and C. Jiang, "Teaching research on the course of precision processing technology basing on the engineering education certification," *cience Education Article Collects*, vol. 48, no. 3, pp. 71-72, 2018.
[16] S. Price and P. A. Flach, "Computational support for academic peer review: a perspective from artificial intelligence," *Communications of the ACM*, vol. 60, no. 3, pp. 70–79, 2017.
[17] R. Abdalla-Aslan, T. Yeshua, D. Kabla, I. Leichter, and C. Nadler, "An artificial intelligence system using machine-learning for automatic detection and classification of dental restorations in panoramic radiography," *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, vol. 130, no. 5, pp. 593–602, 2020.
[18] J. M. Marbán and E. J. Sintema, "Pre-service secondary teachers' knowledge of the function concept: a cluster analysis approach," *JRAMathEdu (Journal of Research and Advances in Mathematics Education)*, vol. 5, no. 1, pp. 38–53, 2020.
[19] N. B. Ermakov, Y. V. Plugatar, and V. D. Leiba, "Endemic Quercus pontica C. Koch. communities from the Colchic Province and new syntaxonomical concept for the Caucasian subalpine krummholz vegetation," *Botanica Pacifica*, vol. 205, no. 1, pp. 581–586, 2020.
[20] A. S. Cheam and M. Fredette, "On the importance of similarity characteristics of curve clustering and its applications," *Pattern Recognition Letters*, vol. 135, no. 12, pp. 360–367, 2020.
[21] U. Srilakshmi, N. Veeraiah, Y. Alotaibi, S. Alghamdi, O. I. Khalaf, and B. V. Subbayamma, "An improved hybrid secure multipath routing protocol for MANET," in *IEEE Access*IEEE, Piscataway, NJ, USA, 2021.
[22] C. Li, H. J. Yang, F. Sun, J. M. Cioffi, and L. Yang, "Adaptive overhearing in two-way multi-antenna relay channels," *IEEE Signal Processing Letters*, vol. 23, no. 1, pp. 117–120, 2016.
[23] M. Adil, M. K. Khan, M. Jamjoom, and A. Farouk, *MHADBOR: AI-Enabled Administrative Distance Based Opportunistic Load Balancing Scheme for an Agriculture Internet of Things Network*, IEEE, Piscataway, NeJ, USA, 2021.
[24] F. Meng, Y. Zheng, S. Bao, J. Wang, and S. Yang, "Formulaic language identification model based on GCN fusing associated information," *PeerJ Computer Science*, vol. 8, p. e984, 2022.
[25] J. Y. Hong, H. Ko, L. Mesicek, and M. B. Song, "Cultural intelligence as education contents: exploring the pedagogical aspects of effective functioning in higher education," *Concurrency and Computation Practice and Experience*, vol. 33, 2019.