Connotation and Contemporary Value of Ecological Art Education under the Background of Integration of Industry and Education

Fanyu Meng

School of Art, Zhejiang Yuexiu University, Shaoxing, Zhejiang, China
20201030@zyufl.edu.cn

Abstract: "Ecological art education" is a representative aesthetic education concept. This paper aimed to study the content and contemporary value of ecological art education in the context of integration of industry and education. It was proposed to use decision tree algorithm and association rule algorithm to study ecological art education under big data technology. The timeliness evaluation method of industry education integration was used to evaluate before and after the implementation of industry education integration. In the experiment, it was learned that the teaching level of art teachers was divided into four levels. Before the implementation of the policy of integration of production and teaching, 117 sophomores, 97 junior students and 91 senior students felt that the level of teachers in the school was not enough, still at the middle level, and their professional ability was poor. After the implementation of the policy of integration of production and education, 131 sophomores, 124 junior students and 148 senior students believed that the teaching level of teachers in the school was excellent. It can be seen from this part of data that after the implementation of the policy, the school has strengthened school enterprise cooperation, which has improved the quality of teachers' teaching level. The experimental results showed that the experimental methods selected in this paper were effective in the research of ecological art education.

1. Introduction

With the rapid development of today's society, the all-round development of people has become an inevitable trend of social development. Ecological art education plays an important role in the all-round development of people. At the same time, due to the continuous improvement of the level of social competition, more people choose to seek development in the field of art. Therefore, ecological art education has also received attention. The development of ecological art education is an inevitable choice for the current development. The implementation of this educational concept is conducive to improving students' comprehensive artistic ability, as well as promoting the development of students' artistic creativity and cultural quality.

At present, there are many researches on ecological art education. Zagkotas V proposed to apply

the method of visual design to language, design and other courses, fully reflecting the value of ecological art education [1]. Liu B believed that the changes in the policies and learning environment of the education sector had led to the introduction of ecological art education, which could improve students' comprehensive art skills [2]. Vuk S analyzed the contemporary art education and studied it in combination with the educational model of primary and secondary schools [3]. Nylander E made a comprehensive analysis of ecological art education using sociological methods. Many people believed that this education model did not reflect its usefulness in the education process [4]. Fernbach E proposed that ecological art education should be developed in primary education, because primary school students have strong learning ability and can absorb this comprehensive education content in an all-round way [5]. However, the above research is more theoretical, with less specific data research and weak reliability.

At present, in the context of industry education integration, the research on ecological art education using big data technology is very extensive. Rahmat M K believed that ecological art education was a comprehensive art with strong creativity and criticism. Such art education helped students master and absorb art knowledge [6]. Aljkovi-Kadri S used big data technology to analyze the education model of art education institutions for students. Few institutions combined art theory with practice for teaching [7]. Aigul P believed that ecological art education could achieve more comprehensive development under the background of combination of industry and teaching, which could not only provide enterprises or operating institutions with a large number of art talents, but also improve the popularity of schools [8]. Bychkova E F believed that the industry education integration model was conducive to the development of ecological art education and could promote the development of school enterprise cooperation model [9]. Safranov T believed that in the context of integration of production and education, ecology was the better development of art education. On the one hand, it provided a good platform for students' future development. On the other hand, it could improve students' professional skills [10]. However, the above analysis did not reasonably solve the problem that ecology is art education.

The innovation of this paper is: (1) Under the big data technology, the decision tree algorithm and association rule algorithm are used to analyze the influencing factors of ecological art education in Area A. (2) This paper introduces the impact of the combination of industry and teaching on ecological art education before and after the implementation of the policy of combination of industry and teaching, and the impact on teachers and students in colleges and universities.

2. Approaches to Ecological Art Education in the Context of Integration of Industry and Education

2.1 Ecological Art Education

Ecological art education is a comprehensive art education based on music, design and other disciplines [11]. Aesthetics is a form of art education that combines art, art criticism, creative art and other disciplines. As shown in Figure 1, it is a scene map related to ecological art education.

The combination of industry and teaching refers to that vocational schools actively build professional sectors according to their majors, build the school into an operation organization integrating talent training, scientific research and technology, and create a school-based school running mode that connects schools and enterprises [12-13]. As shown in Figure 2, it is the school running model of industry education integration.

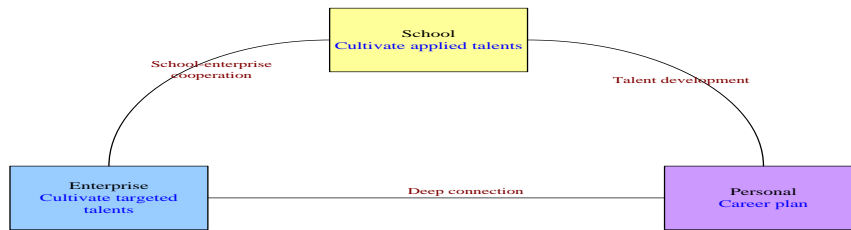Figure 1: Scenarios related to ecological art education

Figure 2: The school running model of industry education integration

In the context of combination of industry and teaching, it is beneficial to use big data technology to analyze and research ecological art education. It can speed up research and improve research quality. This paper analyzes the contemporary value of ecological art education mode with decision tree algorithm and association rule algorithm under big data technology.

2.2 Big Data Technology

Big data technology refers to an information technology that can grasp a large amount of data information, screen and professionally process these data [14-15].

(1) Decision tree algorithm

Decision tree is a data mining method used for classification, prediction, rule extraction and other fields [16]. It has the advantages of fast training performance and high accuracy. As shown in Figure 3, it is the basic principle of the decision tree algorithm.
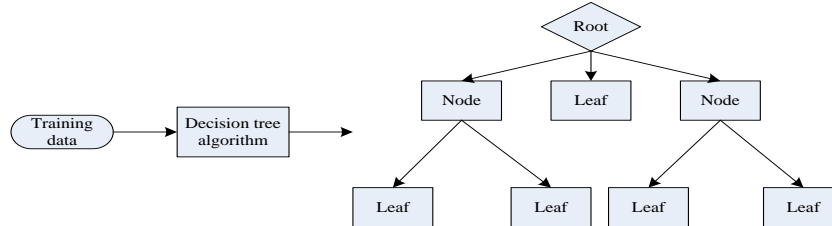

Figure 3: Basic principle of decision tree algorithm

It is supposed that node Y is a tuple storing partition Q, which contains x samples of different kinds $C_i(i=1,2,...,x)$. The entropy before division Q is used to calculate the increase or decrease of information, which is recorded as $Info(Q)$:

$$Info(Q) = -\sum_{i=1}^{x} p_i \log_2(p_i)$$

(1)

Among them, p_i represents the probability that any tuple belongs to category C_i. $\inf o(Q)$

represents the average amount of information required to identify the class label of tuples in Q.

When calculating the increase or decrease of information, the entropy of Q after division is also needed. It is supposed that one attribute L gets k different discrete values $\{Q_1, Q_2, ..., Q_k\}$. Q_j is a data sample containing Q_j values of attribute L in Q sets. The formula for calculating $Info_L(Q)$ is as follows:

$$Info_L(Q) = \sum_{j=1}^{k} \frac{|Q_j|}{Q} \times Info(Q_j)$$

(2)

The information increase/decrease of attribute L of node Y is recorded as $Gain(L)$. The calculation formula is as follows:

$$Gain(L) = Info(Q) - Info_L(Q)$$

(3)

The above formula is used to calculate the information increase/decrease change of each attribute in node Y, and attribute L of $Gain(L)$ with the highest confidence is selected as the split attribute of the given node.

(2) Association rule algorithm

Association rule algorithm is a method for analyzing the degree of association between things.

It is supposed that $I = \{i_1, i_2, ..., i_x\}$ is a data item set of x different items. Q represents the total set of things T. T represents the set of items, and T is the set of a group of items in I, that is, $T \subset I$. If itemset $M \subset I$ and $M \subset T$ v, then transaction set T contains itemset M. An association rule is an implication in the form of $M \Rightarrow N$, in which $M \subset I$, $N \subset I$, $M \cap N = \Phi$. The support degree in the transaction database Q is equal to the ratio of the number of objects including M and N in the transaction set to the number of objects, which is recorded as $\sup port(M \Rightarrow N)$. The confidence level of transaction database Q and the ratio of the number of transactions containing M and N to the number of transactions containing M are equal, which is recorded as $confidence(M \Rightarrow N)$. Then:

$$\sup port(M \Rightarrow N) = P(M \cup N)$$

(4)

$$confidence(M \Rightarrow N) = P(N|M)$$

(5)

The resulting strong association rules are the minimum support and minimum confidence given by the user.

2.3 Evaluation Method for Timeliness of Production Education Integration

From the perspective of the comprehensiveness and objectivity of the evaluation, the participants in the comprehensive evaluation of the combination of industry and teaching - enterprises and faculty, teachers and students of cooperative schools are the main body of the evaluation. Among the evaluation methods of experts, there are data envelopment analysis, fuzzy comprehensive evaluation, etc. Among them, the fuzzy comprehensive evaluation method plays a strong role. Therefore, many experts choose the fuzzy comprehensive evaluation method to evaluate the

integration of production and education. Research on the transformation of colleges and universities is the method used to assess the impact of the combination of production and education, and it is difficult to extract indicators. Therefore, this paper selects the fuzzy comprehensive evaluation method to evaluate the efficiency of industry education integration. The specific methods are as follows:

(1) Determine the evaluation factor set

According to the influencing factors of the timeliness of the combination of industry and teaching, the fuzzy comprehensive evaluation index system is composed of 2 primary factors, 6 secondary factors and 15 tertiary factors.

(2) Determine evaluation set

Four aspects of timeliness of integration of production and education are established.

(3) Determine the fuzzy evaluation matrix

The fuzzy evaluation matrix is:

$$A = \begin{bmatrix} a_{1,1} & a_{1,2} & a_{1,3} & a_{1,4} \\ a_{2,1} & a_{2,2} & a_{2,3} & a_{2,4} \\ ... & ... & ... & ... \\ a_{15,1} & a_{15,2} & a_{15,3} & a_{15,4} \end{bmatrix}$$

(6)

(4) Fuzzy comprehensive evaluation

The obtained fuzzy evaluation matrix is weighted:

$$M = VA = [M_1, M_2, M_3, M_4]$$

(7)

Through the above steps, the results of fuzzy comprehensive evaluation can be obtained. Among them, M_1 represents the proportion of "excellent" in the timeliness evaluation of industry education integration. M_2 represents the proportion of "good". M_3 stands for the proportion evaluated as "medium". M_4 stands for the proportion evaluated as "poor".

3. Simulation Experiment of Ecological Art Education under the Background of Integration of Production and Education

3.1 Status Investigation

At present, many art vocational schools pay more attention to the practical training of students, and ignore their actual performance ability, which is limited to the self-development of the school. Cooperation with enterprises is not considered. By strengthening the relationship between schools and enterprises, it can provide employment opportunities for art majors in colleges and universities, and also stimulate students' learning motivation. Based on the combination of industry and teaching, this paper studies the connotation and value of ecological art education. Big data technology is used to integrate and screen the data from the questionnaire survey and select valuable data content by category. This paper examines the state of art education in Area A and uses Area A as the research object.

3.2 Current Results

At present, parents and society pay more attention to the art education of children, which improves their art appreciation ability, and to a certain extent, develops children's intelligence. The

questionnaire in this paper combines decision tree algorithm to classify the questionnaire data. The association rule algorithm is used to analyze the association degree between the classified data, and finally the required data results are obtained.

(1) Students' learning of art courses

In this paper, 800 students in Area A are selected to investigate their learning of art courses. There are 200 students in primary school, junior high school, senior high school and university. The specific investigation is shown in Table 1.

Table 1: Investigation on students' choice of art courses

	Art single	Dance single subject	Integrated Arts	Others
Primary school	56	39	100	5
Junior high school	42	39	113	6
High school	91	71	30	8
University	90	92	13	5

As shown in Table 1, the main courses for students to learn art are art, dance and comprehensive art courses, and some of them learn other art courses. At the primary school stage, the number of students studying comprehensive art is the largest, with 100 students, 56 students studying art, 39 students studying dance, and 5 students studying other art courses. In junior high school, the number of people studying comprehensive art is also the largest, with 113 people, 42 people learning art, 39 people only learning dance, and 6 people learning other art courses. In high school, students who study single subject art are more than students who study comprehensive art subjects. Among them, 91 students study art and 71 students learn dance. However, only 30 students choose to study comprehensive art courses, and 8 students study other courses. At the university level, most students are specialized in art or dance. 90 students are specialized in art. 92 students are majoring in dance. 13 students are studying comprehensive art, and 5 students have studied other art courses.

Table 2: The ideal teaching method of art teachers

Serial number	Teaching methods	Number of people
1	Strictly follow the order and content of the teaching materials	12
2	Select textbooks and add extracurricular learning content	38
3	Let students decide for themselves what to study in art	29
4	Conduct classroom performances	92
5	Conduct classroom art appreciation activities	27
6	Art performance outside	139
7	Art observation outside	63

According to the data, students in primary and junior high schools are more inclined to learn comprehensive art. There are two main reasons. First, students in these two stages have less learning pressure and more spare time, so parents have signed up more art interest courses for children. Second, students in these two stages have strong learning ability. Moreover, by learning more art courses, students' artistic talents mainly tend to be understood. In the high school and college stages, the situation of students learning art is completely opposite to that of students in primary school and junior high school. Most students mainly study single subjects of art. The main reason for this situation is that, on the one hand, students in high school have less time after class

and do not have more time to learn a variety of arts. In addition, at this stage, students' learning ability has been solidified, and there is no good development potential. On the other hand, in the university stage, the school is more inclined to specialized training. The in-depth teaching of an art course makes students better understand this art course, which is more helpful for students to have the ability to specialize in this art work after graduation.

(2) The ideal teaching method of art teachers

As the number of people learning art courses continues to increase, the teaching methods of art teachers should also be appropriately improved. Next, 400 art teachers in art schools in Area A are surveyed to find out what they think is the best teaching method beneficial to students. Specific data are shown in Table 2.

Table 2 shows that each teacher has different requirements and ideas for art courses. These algorithms are integrated and classified through the decision tree algorithm, and the contents of the seven big frames in the table are obtained. Through algorithm analysis, it is learned that 12 teachers believe that the most ideal teaching method is to strictly teach according to the content of the textbook. There are 38 teachers who think that it is beneficial for students to learn art knowledge by choosing teaching materials and adding extracurricular learning content to teach. There are 29 teachers who think that letting students decide what to learn in class can stimulate students' interest in learning. There are 92 teachers who believe that since it is an art class, which is necessary to perform. They feel the best teaching method when performing in class. There are 27 teachers who believe that the most ideal teaching method is to use multimedia equipment to enjoy art performance in the classroom. They believe that this can improve students' appreciation ability to a certain extent. Of course, the art performing in outdoors is recognized by many teachers. 139 teachers believe that this teaching method is a combination of theory and practice, which can improve students' professional skills. There are 63 teachers who think that it is an ideal teaching method for me to carry out artistic observation at that time. This kind of instruction can develop students' exploratory spirit and practical abilities. According to the analysis shown above, the majority of art educators favor teaching techniques that focus on the performing arts curriculum. This form of instruction not only includes theoretical instruction but also allows for group participation, which ensures that students can learn more art knowledge, thus improving their art skills.

(3) Art teaching environment and conditions

The quality of art teaching environment and conditions can affect the number of students, students' interest in learning and teachers' teaching level. In this paper, 200 students are randomly selected from L University to conduct a questionnaire survey to find out whether their art teaching environment in the school meets the requirements of the heart for the art teaching environment. Specific data are shown in Table 3.

Table 3: Art teaching environment and conditions

	Meets the requirements	Not meet the requirements
Full-time art teacher	73	127
There is a dedicated art classroom	157	43
Art teaching necessities	27	173
With multimedia teaching equipment	155	45

It can be seen from Table 3 that each student has different views on the teaching environment. 73 students think that L University has full-time art teachers to teach, but 127 students think that the full-time art teachers do not meet their requirements. As L University is an art university, it is

equipped with a special art classroom. 157 students think that the art classroom meets their requirements, but 43 students think that the art classroom does not meet their requirements. The equipment of these art classrooms is relatively old and has not been updated in time. 173 students feel that the school lack the necessities of art teaching, while only 27 students think that the school is a necessity of art teaching. In colleges and universities, multimedia equipment is a common teaching equipment. 155 students believe that the multimedia equipment of the school meets the teaching requirements, but 45 students believe that the multimedia equipment of the school is not necessary for art students. Therefore, the multimedia teaching tools provided by the school for art students are relatively backward and do not meet their requirements. From the analysis of these data, it can be seen that although L University is a university dominated by art majors, its teaching equipment and teachers' level are not perfect. Therefore, schools should face this problem squarely. Schools should purchase art teaching supplies that meet the teaching standards. Schools should find suitable enterprises to strengthen the level of school enterprise cooperation. It is necessary to introduce talents with higher professional level from enterprises as teaching teachers in schools. Moreover, schools can train more outstanding graduates and provide talents for enterprises.

(4) Comparison before and after the combination of industry and teaching

The promotion of the implementation of the policy of combination of industry and teaching is conducive to the development of ecological art education. This paper uses the timeliness evaluation method of the combination of industry and teaching to evaluate and analyze college students, teachers and other subjects. The work of the graduates of L Art University before and after the implementation of the industry education integration policy is randomly investigated. 300 graduates of L University before and after the industry education integration are selected, as shown in Figure 4.
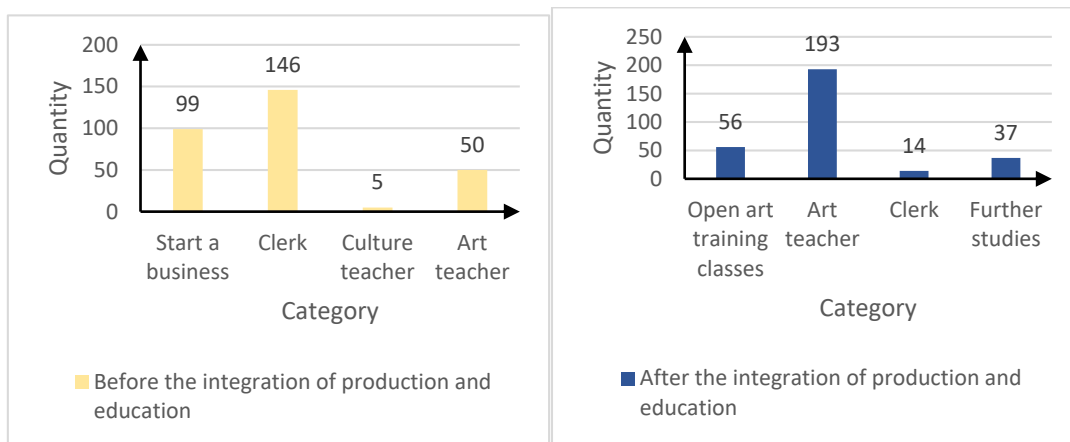
(a) Types of work mainly engaged by graduates before the combination of industry and teaching (b) Types of work mainly engaged by graduates after the combination of industry and teaching

Figure 4: Main jobs of graduates before and after the combination of industry and teaching

It can be seen from Figure 4 (a) that it is the survey of graduates before the implementation of the policy of combination of industry and teaching. These graduates have many jobs to choose after graduation. Most of them choose different jobs from the art majors they studied in universities to earn a living. The main jobs they choose are to be a clerk and a culture teacher. A few students become art teachers related to their majors after graduation. Some students choose to start a business after graduation. Among them, 99 people choose to start their own businesses after graduation, and 146 people work as clerks in enterprises. These two choices account for the majority of graduates. As art graduates have relatively weak achievements in cultural courses, only 5 of them are teachers of cultural courses after graduation. Some students with solid professional

skills work as art teachers after graduation. There are 50 of them. Figure 4 (b) is a survey on the employment of college graduates after the implementation of the policy of integration of production and education. After graduation, most of these students are engaged in art work related to their majors. Some students, 56 in number, have chosen to run art training courses after graduation because of their sufficient funds. Due to the thorough implementation of the policy, most of the graduates have learned professional knowledge during their school years with more opportunities for live performances and rich performance experience. Therefore, there are 193 people who choose to be art teachers after graduation. When these graduates become art teachers, their professional level is higher and their teaching ability is stronger. There are 37 students who choose to continue their studies and learn more professional knowledge after graduation. Through the above analysis, before and after the implementation of the policy, graduates choose different jobs. Especially for clerical work, the number of people who choose to work in this job has dropped sharply from before to after the implementation of this policy, while the number of people who choose to be art teachers has risen sharply. It shows that the implementation of this policy is effective and helpful to the development of ecological art education.

Before and after the implementation of the policy of combination of industry and teaching, the professional level of professional teachers in the school has also changed. In this paper, 200 art majors are selected from the three grades of sophomore, junior and senior in L University to investigate the changes in professional level of professional teachers before and after the implementation of the policy. These students have experienced professional studies before the integration of production and teaching at least during their freshman year. The specific data is shown in Figure 5.
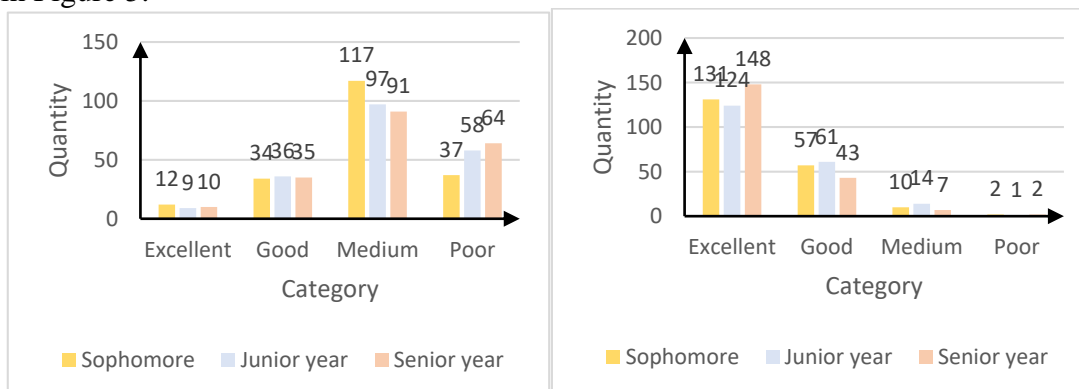
(a) Ability of art teachers in schools before the combination of industry and teaching (b) Ability of art teachers in schools after the combination of industry and teaching

Figure 5: Changes in the ability of art teachers before and after the combination of industry and teaching

It can be seen from Figure 5 (a) that the level of art teachers is divided into four levels: "excellent, good, medium and poor". Only a small number of students in the three grades think the teacher's level is excellent, while most students think the teacher's level is medium. Among them, 12 sophomores, 9 juniors and 10 seniors think that the professional teachers of the school are excellent. 34 sophomores, 36 juniors and 35 seniors feel that the teaching level of art teachers is at a good level. 117 sophomores, 97 juniors and 91 seniors feel that the level of teachers in the school is not enough and is still at the middle level. Finally, 37 sophomores, 58 juniors and 64 seniors believe that the teaching level of teachers in the school is not as good as that of teachers in after-school training institutions, and their professional abilities are poor. The main reason for the above situation is that college teachers have solid theoretical knowledge, but lack of practical experience, which cannot provide students with better practical opportunities. It can be seen from Figure 5 (b)

that after the implementation of the policy of integration of production and education, the professional level of art teachers in colleges and universities has also risen. Among them, 131 sophomores, 124 juniors and 148 seniors believe that the professional level of teachers in the school is excellent. There are 57 sophomores, 61 juniors and 43 seniors who think that the professional ability of the teachers is good. Of course, a small number of students think that the professional level of teachers is not enough. There are 10 sophomores, 14 junior students and 7 senior students who believe that the teacher's professional ability is at the medium level. Two sophomores, one junior and two seniors think that the teacher's professional ability is poor. It can be seen from this part of data that after the implementation of the policy, the school has strengthened school enterprise cooperation, and there are many enterprise professionals. The enterprise provides a large number of professional teachers for the school, and the school provides a large number of talents for the enterprise. Therefore, the professional level of school teachers has also been improved. To sum up, in the context of integration of production and education, ecological art education is beneficial to students, enterprises and schools.

3.3 Countermeasures for the Development of Ecological Art Education

This paper uses big data technology to analyze the art education in Area A under the background of industry education integration. In the process of analysis, it can also be learned that the ecological art education in this area is relatively backward. The professional level of teachers is not enough. There are not many job opportunities for art students after graduation, and their jobs are not guaranteed. In this regard, some development countermeasures have been proposed.

(1) Training teachers for ecological art education

Ecological art education is a new form of art education guided by the concept of ecological agriculture. For teachers involved in ecological art education, their work must be different from the needs of ordinary art education. First of all, there should be enterprising to improve professional skills. Secondly, it is necessary to strengthen physical and psychological quality. Finally, personal qualities should be improved. Teachers are educators, and teachers' personal behavior affects students' behavior, so teachers' personal quality needs to be improved.

(2) Create the atmosphere of ecological art education

A good educational atmosphere is conducive to the effective implementation of educational policies. On the one hand, it is necessary to create a democratic educational environment. The reason why many excellent teachers can achieve success in teaching is that they implement democratic principles and let students fully explore their artistic identity. In the classroom, through dialogue and interactive art between teachers and students, students' artistic potential is discovered and tapped. On the other hand, it is necessary to create an aesthetic education environment. In ecological art education, all kinds of art activities are carried out on the basis of aesthetics, which can not only improve students' interest in art learning, but also cultivate their artistic ability.

4. Discussion

This paper uses the decision tree algorithm and association rule algorithm under big data technology to analyze the ecological art education in Area A, and uses the timeliness evaluation method of industry education integration to analyze the impact of L University on its students and teachers before and after the implementation of the industry education integration policy. It is learned that the development of ecological art education in Area A still has some defects. The teaching level of art teachers in this area is limited, and the teaching methods need to be innovated. Before the implementation of the policy of integration of production and teaching, students and teachers in L University had few opportunities for graduates to engage in their own professional

work, and the teaching level of teachers was low. After implementing the policy of integration of production and education, the university has strengthened the cooperation between schools and enterprises. Most of the graduates are engaged in the work of their majors, and the teaching level of teachers has also been improved. Therefore, in the context of integration of production and education, the contemporary value of ecological art education is fully reflected, which is beneficial to enterprises, schools and students.

Based on the background of the integration of production and education, this paper studies the connotation and contemporary value of ecological art education. In addition, big data technology is used to analyze the influencing factors of ecological art education. This is not only an extension of the application scope of big data technology, but also an in-depth study of ecological art education.

5. Conclusions

In this paper, the decision tree algorithm and association rule algorithm were used to analyze the ecological art education, and the evaluation method of timeliness of industry education integration was used to analyze the impact before and after the implementation of industry education integration. Through the analysis of various factors, a conclusion has also been drawn. The concept of ecological art education in Area A has not been fully developed. The teaching level of teachers is low, and the teaching equipment is relatively backward. Before the integration of production and teaching, there were few employment opportunities for students in L University, and the teaching level of teachers was insufficient. After the implementation of the policy of integration of production and education, L University cooperated with enterprises. The enterprise has provided a large number of jobs. The school has delivered a large number of talents to the enterprise, and students have also been provided with employment opportunities. The enterprise has also delivered a large number of teachers with practical experience to the school, which has a positive impact on schools, enterprises and individuals. The experimental analysis of the article shows that big data technology has played an effective role in the research of ecological art education in the context of integration of industry and education.

Acknowledgement

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