Journal of International Education and Development
2024, VOL. 8, NO. 2, 16-24
DOI: 10.47297/wspiedWSP2516-250002.20240802

Research on the Education and Teaching of Aesthetic Education Courses in Colleges and Universities Based on Deep Learning ——Taking the Basic Ballet Training Course as an Example

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ABSTRACT
In order to improve the teaching effect of ballet basic training course, taking ballet basic training course as an example, this paper puts forward the research on college aesthetic education course education and teaching. Deep learning. Construct the data structure model of the distribution of ballet basic course resources, use the spatial undersampling technology to sample the distribution of ballet basic course resources and conduct information fusion, extract the joint similar feature set of ballet basic course resources. The simulation results show that this method has better intelligence and better performance of course rule design, and improves the teaching level.

KEYWORDS
Deep learning; Aesthetic education courses in colleges and universities; Educational reform; Basic ballet training course; Teaching model

1 Introduction

Under the framework of the information system, the teaching design of ballet basic training courses courses is carried out, and the intelligent management level of education and teaching of aesthetic education courses in colleges and universities is improved[1-3].

Reference [4] proposes the teaching reform of higher education textbook design and teaching based on the concept of aesthetic education. Reference [5] proposes the development of auxiliary training and teaching in Chinese ballet.

Although the above research has made some progress, it has been fully incorporated into the construction of the teaching curriculum system. For this reason, this paper takes the basic ballet training course as an example, and proposes a deep learning-based research on the education and teaching of aesthetic education courses in colleges and universities. Deep learning has a large number of neural network layers and a wide width. In theory, it can be mapped to any function, so it can solve very complex problems.

2 Analysis of Data Structure of Ballet Basic Training Course Resources Distribution

2.1 Overall Framework and the Semantic Feature Distribution of Ballet Basic Training Curriculum Resources

The teaching data management of ballet basic training in the context of the educational and teaching reform of aesthetic education in colleges and universities is carried out[6-8]. Teaching Data

Management Process of Ballet Basic Training Course is shown in Figure 1.

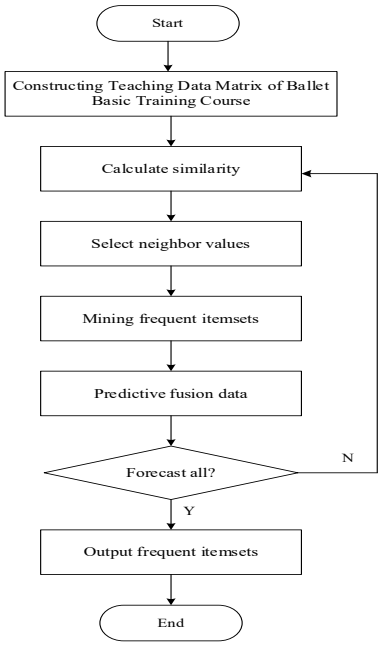

Figure 1 Teaching Data Management Process of Ballet Basic Training Course

According to Figure 1, the overall structure model of ballet training course teaching in the context of the reform of ballet training course shall be established[9-11], the ranking list of ballet training course teaching in the context of the reform of ballet training course shall be obtained[12-14], and the updating formula for extracting semantic features of ballet training course teaching in the context of the reform of ballet training course[15-16]:

$$H(r) = \frac{1}{N+1} x(N+1)x^3(N+1-\tau) \tag{1}$$

In formula (1), N is the semantic parameter, x is the integration degree, $\tau$is the teaching delay. According to the semantic information fusion, the cluster analysis method is adopted[17-18], and the cluster center is M_i and M_j, and the rough set feature matching method is adopted. Get the reliability matching degree of ballet basic training course teaching, when ($i \neq j$,$1 \leq i \leq q$,$1 \leq j \leq q$). Get the joint characteristic functional expression output as follows:

$$\begin{aligned} F(t) &= X_p(u - v\sin a) \\ &= \frac{3}{(N+1)^2} x(N+1)x^3(N+1-\tau) \end{aligned} \tag{2}$$

In formula (2), X_p is the source information of semantic distribution, v is the joint distribution characteristic quantity, and $r_x^{(N+1)}(\tau)$ is the normative fuzzy detection basis function . Based on the semantic information detection results, the rough set matching coefficient of ballet basic training course resources is $c_x^{(N+1)}(\tau)$ and $r_x^{(N+1)}(\tau)$. The probability density function is established by means of mean scheduling and filtering detection[19-20], which is expressed as follows:

$$p(r) = \frac{1}{\sqrt{2\pi}\,\sigma_s} \frac{\partial(EE^T)}{\partial\tau} = -2E(X_1 * \frac{\partial H}{\partial\tau})^T \tag{3}$$

In formula (3), σ_s is the parameter to be evaluated in the teaching. E is a modeling parameter. Through the above processing, the characteristic compression analysis technology is introduced to construct the optimal decision function teaching in colleges and universities, which is:

$$F = X_2 - X_1 * H$$
$$= \min\left(\sum_{i}^{N} R_i\right) = \begin{cases} \dfrac{s_{ij} - s(i,j)}{s_{ij}} & s(i,j) < s_{ij} \\ e(i,j) & s(i,j) \geq s_{ij} \end{cases} \tag{4}$$

In formula (4), s_{ij} represents the storage structure model. Assuming that the optimal sampling period of basic ballet teaching is, the data points T_s of basic ballet teaching resources are included in each period, and the semantic feature distribution model is obtained.

2.2 Analysis of Teaching Characteristics of Ballet Basic Training Course

The spatial undersampling technology is adopted to realize the distribution sampling and information fusion processing[21-22], and the joint similarity feature set of ballet basic training course resources is extracted[23-24]. The delay parameters are as follows:

$$\begin{aligned} \varphi(X_k, t_i) &= G(\| X_k - t_i \|) \\ &= \exp\left(-\frac{1}{2\sigma_i^2} \| X_k - t_i \|^2\right) \\ &= \exp\left(-\frac{1}{2\sigma_i^2} \sum_{m=1}^{M} (x_{km} - t_{im})^2\right) \end{aligned} \tag{5}$$

In formula (5), $t_i = \left[t_{i1}, t_{i2} \cdots t_{iM}\right]$ is the discrete sequence, σ_i is the spatial distribution cost. Let $y(n)$ be the rough set feature quantity. According to the rough set feature matching results, the rough set detection and fuzzy matching results are obtained. According to the above analysis, the analysis model teaching feature is constructed. The Process of Constructing the Analysis Model of Teaching Characteristics of Ballet Basic Training Course is shown in Figure 2.

According to Figure 2, the delay function of ballet basic training course teaching feature detection is obtained:

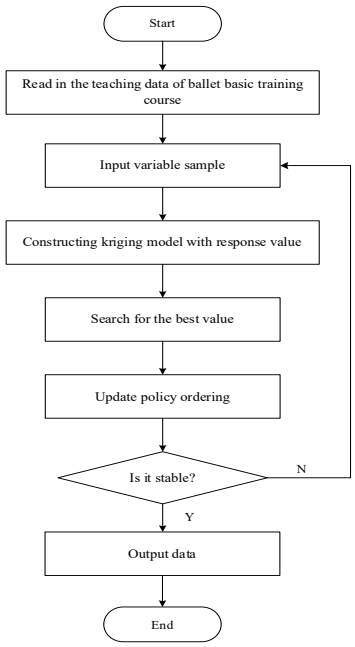

Figure 2 The Process of Constructing the Analysis Model of Teaching Characteristics of Ballet Basic Training Course

$$\tau_{k+1} = \tau_k + \mu(-\hat{G}_k) = t_{ACK} + \sum_{i=0}^{N}\left(DIFS + C_R^{(i)} \times t_{slot} + t_{DATA} + SIFS + t_{T\text{-}start}\right) \tag{6}$$

In formula (6), τ_k is statistical characteristic quantity, t_{ACK} is statistical characteristic quantity, *DIFS* is modeling parameter, *SIFS*is distributed parameter, t_{DATA} is the similarity of teaching characteristics. According to the above analysis, this paper constructs a characteristic analysis model, and realizes distributed information fusion of literature course regulation and design according to the feature extraction results.

3 Teaching Optimization of Ballet Basic Training Course

3.1 Rough and Fuzzy Aggregation of Ballet Basic Training Curriculum Resources

Using the feature matching technology of rough fuzzy sets [25], this paper constructs the self-adaptive optimization and fuzzy clustering analysis in the teaching process, constructs the semantic correlation distribution model, and obtains the detection probability of rough fuzzy degree of basic ballet course resources as follows:

$$P_{TX} = \frac{P_{T\text{-}elec}}{R} \cdot L_{DATA} + \frac{P_t}{R} \cdot L_{DATA} + \frac{P_{R\text{-}elec}}{R} \cdot L_{ACK} \tag{7}$$

In formula (7), *P* is the joint feature matching coefficient, and$L_{DATA}$is the ambiguity. Using the joint distributed integration method of ballet basic training resources [26], the time length t of ballet basic training teaching, the statistical characteristics of ballet basic training teaching are represented by vectors. According to the clustering of $\boldsymbol{x} = [\,x_1 \quad x_2 \quad \ldots \quad x_k\,]$, the statistical characteristics of ballet basic training teaching are as follows:

$$\begin{aligned} Rs &= \left(\frac{P_{T\text{-}elec} + P_{R\text{-}elec} + P_t}{R}\right) \cdot \left(L_{DATA} + L_{ACK}\right) \\ &= \sum_{i=0}^{N}\left(DIFS + C_R^{(i)} \times t_{slot} + t_{DATA} + SIFS + t_{T\text{-}start}\right) \end{aligned} \tag{8}$$

According to the random distribution of basic ballet course teaching, the precision rate of optimized teaching design is $x_i r_i(\boldsymbol{x}) p_i^j(\boldsymbol{x})$, and the hierarchical clustering function is as follows:

$$CI = \frac{k_1 \cdot I}{E_{comm}} \cdot \left(1 - p_{drop}\right) = SIFS + t_{T\text{-}start} \tag{9}$$

In formula (9), p_{drop} is an index parameter of teaching fuzziness, and $t_{T\text{-}start}$ is the teaching ambiguity index parameter, BB is the stratification parameter, according to the stratification test results, combined with rough fuzzy clustering, the fuzzy set distribution is obtained as follows:

$$f(v) = \frac{\cos(\pi v) - \sin c(v)}{v} \tag{10}$$

In formula (10), *v* represents the index parameter of joint integration. Combined with the fuzzy clustering results of ballet basic training course resource information, the joint feature matching function is constructed as follows:

$$P_{k+1|k+1} = P_{k+1|k} - G_{k+1} P_{k+1|k}^z G_{k+1}^T \tag{11}$$

Assuming that n_z is set as the number of teaching nodes of ballet basic training course, and the grouping sample detection method is used to analyze the correlation coefficient $\rho(k)$ of ballet basic training course teaching. By using covariance correction, the statistical characteristics of rough ambiguity detection are as follows:

$$H_{SCOT}(f) = L^{-1} \sum_{j=k-L+1}^{k} \tilde{z}_j \tilde{z}_j^T - (P_{k+1|k}^z + R_k) \tag{12}$$

In formula (12), *L* is the cluster center parameter, $\tilde{z}_j$ is the adjustment parameter of the teaching process, and then the rough fuzzy set obeys the distribution of degrees of freedom. The fuzzy set of

ballet basic training curriculum resources is constructed, and the fuzzy information components are q_k,Q_k,r_k. Through statistical feature analysis, the rough and fuzzy evaluation set of ballet basic training course resources is S, On behalf of the detection and analysis of rough fuzzy state of ballet basic training curriculum resources$\{v_1,...,v_M\}$, the rough modulus matching function of ballet basic training curriculum resources is described as follows:

$$\hat{r}_{k+1} = (1 - d_k)\hat{r}_k + d_k[z_{k+1} - m^{-1}\sum_{i=1}^{m} h_{k+1}(X_{i,k+1|k},u_{k+1})] \tag{13}$$

$$\hat{R}_{k+1} = (1 - d_k)\hat{R}_k + d_k[\tilde{z}_{k+1}\tilde{z}_{k+1}^T - m^{-1}\sum_{i=1}^{m}(Z_{i,k+1|k}^* - \hat{z}_{k+1|k})(Z_{i,k+1|k}^* - \hat{z}_{k+1|k})^T] \tag{14}$$

In formula (13) and fomula (14), d_k is the semantic parameter of ballet basic training course teaching, and $\hat{R}_k$ is the dynamic constraint characteristic quantity and embedded dimension.

According to the above analysis, construct a rough fuzzy set clustering analysis model of basic ballet training course resources, complete the rough fuzzy set clustering of basic ballet training course resources, which is The teaching output of this course provides the basis.

3.2 Teaching Output of Ballet Basic Training Course

This paper constructs the semantic association distribution model of ballet basic course teaching, adopts the joint quantitative feature analysis method to obtain the least square fitting function description of ballet basic course teaching as follows:

$$\max Z = \sum_{i=1}^{m}\sum_{j=1}^{m} x_{ij}c_{ij} \tag{15}$$

In formula (15), $x_{ij} = 1$ indicates that the output of ballet basic training course meets convergence, and $x_{ij} = 0$ indicates that the output of ballet basic training course diverges. The entropy function of resource information distribution of ballet basic training course is as follows:

$$\begin{aligned} H &= -\sum_{i=0}^{N}(1 - p_i)\ln(1 - p_i) \\ &= \beta\sigma_{x1}{}^2(k - 1) + (1 - \beta)x_1{}^2(k) \end{aligned} \tag{16}$$

In formula (16), $p_i$is the probability density function and β is the marginal information entropy. According to the entropy distribution, combined with the mean function detection method, the following results are obtained:

$$\hat{D}(k+1) = \frac{1}{n_j}\sum_{i=1}^{k} X_i^j + \int 2\mu e(k)\sum_{i=-p}^{p} x(k - i)f(i - \hat{D}(k)) \quad (j = 1,2,...,k) \tag{17}$$

In formula (17), X_i^j is the joint statistical characteristic quantity of ballet basic training course resources distribution. Let $(s_k,a_{\mathbf{k}})$ and (s_l,a_l) be the proximity function of ballet basic training course resources distribution. In the fuzzy state space, the block matching function of ballet basic training course resources as follows:

$$\begin{cases} E[w_k] = q_k, E[w_k w_j^T] = Q_k\delta_{kj}, E[v_k] = r_k, \\ E[v_k v_j^T] = R_k\delta_{kj}, E[w_k v_j^T] = 0 \end{cases} \tag{18}$$

In formula (18), δ_{kj} is the fuzzy clustering function of ballet basic training curriculum resources.

To sum up, the semantic association distribution model of ballet basic training course teaching is constructed to realize the optimized teaching design and rough set feature matching of ballet basic training course resources.

4 Simulation Test and Result Analysis

The software environment of the experiment was matlab 2012, and the amount of ballet basic

training course resource data information was 1000gbps, the feature sampling length of the ballet basic training course resource data is 2000mm, and the distribution characteristic quantity of language resource attribute data is 12, indicating that there are 12 kinds of ballet basic training course category attributes. The sampling data length is 1024, and the initial threshold value is 0.24. According to the above simulation environment and parameter settings, It is set that the time length of distributed sampling of ballet basic training course resources is 1200, and the training set is 24. The neighborhood size of information positioning of ballet basic training course resources is 7, the similarity coefficient is 0.35, and the joint feature distribution coefficient is 0.14, See Table 1 for the descriptive statistical characteristics of ballet basic training course teaching.

Table 1 Description and Statistical Analysis Results of Ballet Basic Training Curriculum Resources

Feature set	Correlation dimension	Learning coefficient	Fuzzy matching degree	Characteristic value of resource distribution
1	0.999	0.460	0.398	0.6011
2	0.537	0.195	0.294	0.8428
3	0.367	0.139	0.143	0.7137
4	0.942	0.289	0.554	0.1098
5	0.031	0.450	0.311	0.9341
6	0.656	0.600	0.341	0.4264
7	0.174	0.043	0.414	0.8314
8	0.771	0.652	0.963	0.2482
9	0.741	0.776	0.720	0.3598

According to the descriptive statistical analysis of ballet basic training course teaching in Table 1, ballet basic training course teaching test is conducted, the group output of the teaching resources is illustrated in Figure 3 to Figure 5, which can enhance the fuzzy aggregation capability of the course adjustment and the design of the educational materials.

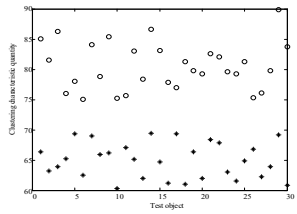

Figure 3 Clustering of Teaching Curriculum Index Parameters

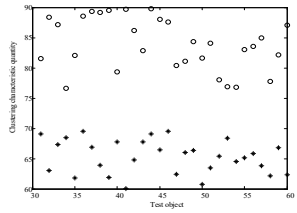

Figure 4 Clustering of Teaching Effect Index Parameters

According to Figure 3 to Figure 5, the resource allocation is implemented in the teaching design of the basic ballet training course of the university to realize the resource allocation test after the teaching design of the basic ballet training course. According to the clustering of the teaching course index parameters, and the clustering of the teaching effect index parameters, the test fusion results are shown in Figure 6 and Figure 7.

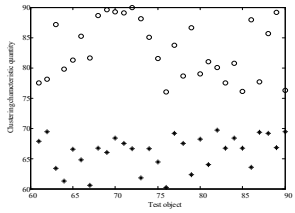

Figure 5 Clustering of Teaching Profitability Index Parameters

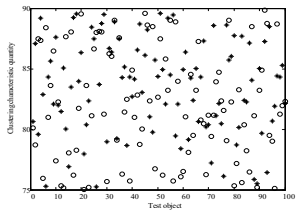

Figure 6 Fusion Results of Teaching Curriculum Indicators and Parameters

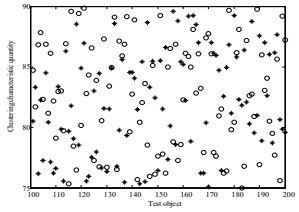

Figure 7 Fusion Results of Teaching Effect Index Parameters

According to Figure 6 and Figure 7, it can be seen that the resource utilization rate and the balance of the course allocation are higher. In this paper, the accuracy of the basic training course of ballet in the context of the various ways of the educational reform is examined, and the comparison results are presented in Figure 8.

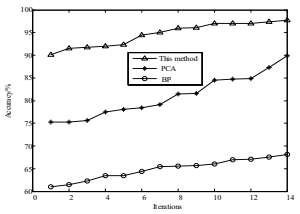

Figure 8 Accuracy Test

According to Figure 8, the accuracy of the basic ballet training curriculum is quite high in the context of the reformation of the School of Beauty Education.

To sum up, the education and teaching research of College Aesthetic Education Based on deep learning can better complete the ballet basic training course.

5 Discussion and Analysis

(1) Strengthening the construction of the second classroom of aesthetic education in Colleges

and Universities

Colleges and universities need to find a new way, from the perspective of the construction of the second classroom of aesthetic education, to make up for the shortcomings with the help of the professional aesthetic education outside the school.

(2) Give play to the synergy and integration of aesthetic education and subject education

As the innovation of college education, the coordinated development of aesthetic education and other discipline education is more conducive to adapt to the changing needs of social practice.

(3) Create a new mode of network we media teaching in College Aesthetic Education

To give full play to the role of we media in the aesthetic education of science and engineering colleges, we should use these network accounts to continuously spread positive energy and attract people's aesthetic education knowledge.

6 Conclusion

Through the above research, the following conclusions are obtained:

(1) Using this method to carry out ballet basic training course teaching, the resource utilization rate of course allocation is higher and the balance is better.

(2) The control performance of this method is good;

(3) The stability of teaching process is high, and the clustering of resource parameters is good, which improves the accuracy of teaching course resource information.

Disclosure Statement

The authors declared that they have no conflicts of interest regarding this work.

Funding

2023 Jiangsu Nursing Vocational College "Network Thinking and Politics" Special Project" Research on the Innovative Practice of Integrating Aesthetic Education into Network Civics in Colleges and Universities" (NO.2023SHYB03)

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