International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 17 (2025) pp. 1-16

https://doi.org/10.70917/ijcisim-2025-0322
Article

Integration and Conflict between Traditional Education and Modern Social Values in Taiwan

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Abstract: This paper organizes the traditional educational ideological claims and proposes that the modern educational concept is a new concept constructed on the basis of a thorough critique of traditional educational thought. For the development of modern education, it proposes blended teaching based on online open course platform and the construction of online and offline quality teaching resources. The resource storage load allocation is optimized by improving the consistency hash algorithm, and the deep neural network-based educational information intelligent push model is used to improve specialized teaching resources for learners in modern society, emphasizing the personalized development of teaching and learning. The simulation analyzes the effectiveness of the weight-based consistent hashing algorithm for resource storage load allocation, proposes research hypotheses, and verifies the effectiveness of the online open course platform based on intelligent recommendation of educational information for optimizing the teaching experience. Taking the blended teaching based on the online open course platform in modern society as a representative, we compare and analyze the effectiveness of teaching based on the blended teaching of the online open course with the traditional teaching. Students in the experimental group scored 22.47±3.77 on subjective questions, 38.29±3.57 on operational questions, and 83.86±4.91 on total scores, while students in the control group scored 20.64±3.52 on subjective questions, 32.55±3.04 on operational questions, and 71.75±6.37 on total scores.For the course of Industrial Robot Programming and Commissioning, teaching performance under traditional education in Taiwan is compared with that under blended teaching in modern society. There is a difference of 12.11 in the total score between the teaching performance and the hybrid teaching performance under the modern society, which indicates that the traditional education can not meet the demand of talent development in the modern society, and that advanced technologies such as machine technology can be utilized to transform the traditional education and teaching and to commit to the high-quality development of education.

Keywords: consistent hash algorithm; educational information push model; blended teaching; teaching resources; online open courses;; traditional education in Taiwan

1. Introduction

Traditional education and modern social values in Taiwan have always been two different directions in people's thinking and lifestyle [1-2]. As a representative of different stages of development in Taiwanese society, the integration and conflict between traditional education and modern social values are inevitable [3-4].

Traditional education in Taiwan emphasizes teacher authority, standardized learning paths, and transmission and obedience to knowledge [5]; modern education under modern social values emphasizes the concepts of critical thinking, inquiry-based learning, and lifelong learning [6]. If the two stand alone, it is easy to produce educational division and conflict: on the one hand, students may lack autonomy and innovation, and on the other hand, teachers and schools may neglect the cultural roots and ethical boundaries [7-8]. The fusion of the two lies in the integration of inherited knowledge and modern learning methods into the classroom [9]. Teachers can combine the value of classic texts with real-life cases and guide students to ask questions, test hypotheses, and support conclusions with data and evidence while respecting history [10-11]. Schools should also establish a synergistic mechanism with families and communities, so that knowledge transmission is no longer passive acceptance, but a process of cross-generational dialog and common growth [12]. The concept of lifelong learning shifts the development of individuals from “getting into a good school” to “continuously renewing one's own abilities and values”, which is the basic requirement of modern social values for individuals, and also the correction and expansion of certain rigid mechanisms in traditional education [13-15].

Regarding the research on the integration and conflict between traditional education and modern social values, literature [16] discusses the conflict between the traditional and modern education systems, examines it through a value-based perspective, and shows through a literature review and survey that achieving a balance and integration between tradition and modernity has significant social benefits. Literature [17] describes the integration of tradition and innovation in the education system, stating that the education system, as a basic social institution of the state and society, determines its own progressive development and acts as a mechanism to regulate traditional education and innovation. Literature [18] examined the integration of traditional principles in the curriculum of a secondary school and based on analyzing interviews, observations, and recorded data, revealed that the integration of modern education and traditional values helps to develop students' comprehensive literacy and promote the development of educational practices. Literature [19] analyzed the importance of the integration of traditional education with the new era of educational reforms, which not only supports the country's quest for prosperity and recognition, but also promotes the development of business, especially in areas such as the development of responsible and managerial people. Literature [20] aimed to integrate traditional and modern education on the quality of learning and teaching and based on literature review, interviews and other methods, revealed that the integration of traditional and modern education is beneficial in improving the quality of teaching and learning, especially in the areas of curriculum and teaching learning process. Literature [21] examines ways to integrate traditional and modern values in the educational process and emphasizes that through this integration, teachers are able to use innovative thinking to explore their unique teaching methods.

This paper summarizes the characteristics of traditional education and points out the drawbacks of traditional education in the development of modern society, and organizes the traditional education ideological propositions and modern education conceptual propositions respectively. Starting from the demand of the course, the teaching mode of the course in modern teaching is analyzed, i.e., online and offline hybrid teaching based on the online open course platform. Propose key technologies for teaching resource construction of online open courses, including storage load allocation based on weight-consistent hash algorithm to optimize the processing of massive data, and deep neural network-based educational information push model to strengthen the professionalism of online open courses. Simulation verifies the advantages of weight-consistent hashing algorithm based on resource storage load allocation, and analyzes the teaching experience of online open platform based on deep neural network-based educational information push model and traditional platform. Take industrial robot programming and debugging course as an example to analyze the teaching results under modern online open course based blended teaching and traditional education.

2. Traditional education and modern social values

2.1. Development of traditional education in modern society

2.1.1. Obstacles to the development of traditional education in modern society

The traditional examination-oriented education is mainly used in the classroom, teaching mainly by the management, students' performance depends largely on the severity of the teacher's tube. But now the times are changing, the education sector is also changing rapidly, the demand for talent is different from the previous, rely solely on the teacher's classroom indoctrination and strict requirements of this way there are many drawbacks:

(1) It is difficult for students to fully understand and memorize what the teacher teaches in class. Once distracted, they will be left behind, which will lead to the whole class can not keep up with the

rhythm.

(2) The teacher's lecture speed, students can not keep up with the teacher's lectures, listening to lectures and note-taking contradict each other.

(3) The teacher's strict requirements and heavy homework assignments put endless pressure on students.

In addition to the drawbacks of the way of lecturing:

On the one hand, the “innovative thinking” advocated nowadays is an important idea in line with the development of the times. However, traditional education makes students lose the ability of active learning and active thinking, low motivation to learn, poor learning results, and difficult to cultivate students' innovative thinking.

On the other hand, theories can only become the truth through the test of practice. Traditional education only focuses on the learning of theoretical knowledge, but neglects the education of students' practice.

2.1.2. Traditional education neglects lifelong persistence in learning

In modern society, the unit of work is developing and changing, and society's demand for talents is also constantly changing. The specialty that may be in great demand at the beginning of the society has been completely replaced in a few years. Then the talents are facing the embarrassing situation of “not needed in this line, not found across the industry”. In the face of fierce competition in the market, we must receive education at every stage of life, lifelong learning. Traditional education makes the people who leave the campus have no opportunity to learn specialized knowledge again, which limits people's lifelong learning.

2.2. Traditional Education Ideology and Modern Education Concept Orientation

The modern concept of education is a new concept constructed on the basis of a thorough critique of traditional educational thought.

Traditional educational thought advocates the relationship between educator and educated as active and passive, superior and inferior, indoctrinated and indoctrinated, and authoritative and non-authoritative.

The modern concept of education advocates, firstly, an inter-subjective relationship between educator and educated that is equal, interactive, dialogical, and alternating roles. Secondly, the purpose of education is not only the simple transmission and application of knowledge, but also the critique of existing knowledge and the revelation and innovation of the unknown world. Third, the educated subject is able to make individualized choices in the face of an all-encompassing, multidimensional, open and comprehensively developed knowledge system. Fourthly, the subject of education, imbued with the modern concept of education, is capable of adopting a variety of methods and means to implement “dynamic, process-oriented, constructive and comprehensible” teaching and learning.

3. Educational development in modern society

3.1. Blended teaching based on online open courses

(1) Analysis of courses and learning conditions

Online open courses in colleges and universities basically include four teaching programs: awareness, operation, basic training and comprehensive training.

Take the industrial robot programming and commissioning course of a university in Taiwan as an example, the industrial robot programming and commissioning course is the core course of the industrial robotics specialty, which is an integrated course of “theory + practice”. The analysis of students' learning situation and pre-course evaluation show that students generally have weak basic knowledge, it is relatively difficult for them to accept the knowledge points of the specialized courses, they hope to increase the opportunities of hands-on practice in teaching, have more contact with the real cases of enterprises, and make use of the fragmented time to assist the learning of the teaching key points and difficulties through online teaching resources, and the students' interest in the learning of the specialized courses needs to be improved.

(2) Teaching design

According to the results of course analysis and learning situation analysis, teaching design is carried out to determine the teaching methods and teaching tools. The teaching of the course adopts the “double loop” closed-loop teaching mode, as shown in Figure 1, based on the industrial robot programming and commissioning online open course platform to carry out project-based online and offline hybrid teaching.

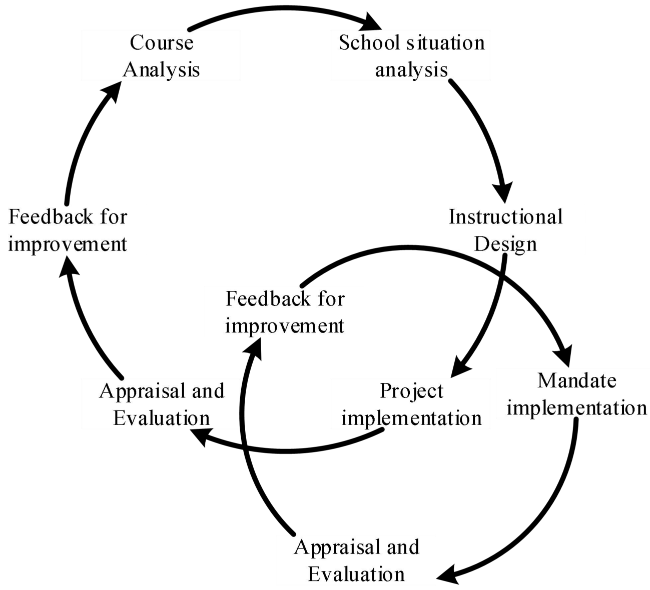

Figure 1. "Double cycle" closed-loop mode teaching mode

(3) Implementation of the mandate

Among the four teaching projects of the industrial robot programming and commissioning course, Project 1, Project 2 and Project 3 enable students to know the industrial robot, to simply use the demonstrator, to carry out basic manual operation of the industrial robot, to be able to set the tool data, workpiece coordinates and payload data of the industrial robot, and to be able to control the industrial robot to carry out linear motion and arc motion by using the writing of the RAPID program. They can program and simulate the industrial robot in Robot Studio software, and complete the basic training of the industrial robot. Project four is the comprehensive use of industrial robots training, complete handling, palletizing, welding and loading and unloading workstation programming and debugging.

Students in the comprehensive application training process, due to the complexity of the industrial robot parameter settings, operating steps, program writing difficulty, if the original traditional teaching, in the implementation of the task, there is no way to watch the teaching resources at any time when there are questions, which increases the difficulty of learning. If pure online teaching is used, students can't directly go to the industrial robot teaching platform for operation and practice after learning theoretical knowledge, which can't effectively improve students' hands-on ability, therefore, this course adopts the online-offline hybrid teaching mode in the teaching process.

(4) Assessment, Evaluation and Feedback Improvement

After the task implementation is completed, the teaching feedback link of teacher self-assessment and student satisfaction survey is used to promote teachers' teaching reflection and improvement.

3.2. Construction of online and offline quality teaching resources

3.2.1. Cloud Computing Technology Advantages and Key Technologies

Online education breaks through the time limit of traditional education and space limitations, where there is a network can be anytime, anywhere teaching and learning, in changing the teaching method based on changing people's mindsets.

The application of cloud computing technology to the construction of computer network teaching platform can effectively alleviate the problem of duplication of resources. Cloud computing technology can also provide a strong guarantee for the network teaching platform resource sharing. Cloud computing technology further improves the quality of teaching resource management as well as maintenance, ensures the efficient and safe operation of the computer network teaching platform, and effectively allocates, stores, manages and encrypts teaching resources and experimental resources.

Cloud computing technology is not a single technology, but a series of key technologies, mainly including virtualization technology, multi-tenant technology, massive data processing technology and multi-dimensional data analysis and push technology and other technologies, as follows:

(1) Virtualization technology: It mainly contains virtualization technology such as system desktop, data server, application program, data storage, etc. Its function is to abstract all kinds of computer resources. Virtualization technology is one of the key core technologies of cloud computing, and all kinds of hardware and software resources in the cloud platform can be virtualized for use by multiple applications, with the purpose of efficiently utilizing and fully integrating various computing and storage resources.

(2) Multi-tenancy technology: Multi-tenancy technology is a software architecture technology that realizes the sharing of the same system or program components in a multi-user environment, while ensuring the isolation of data among users.

(3) Massive data processing technology: the massive data information distributed in the cloud platform can be effectively analyzed, processed and managed by applying massive data processing technology. In addition, one of the common methods to improve the efficiency of massive data processing is to divide the massive data in parallel through the consistent HASH algorithm, and at the same time, utilize multiple groups of computing resources to decompose the task, so as to improve the speed of data processing.

(4) Multi-dimensional data analysis and push technology: machine learning models are used to do analysis and push sorting, and have iterated LR, FM, GBDT, fusion model, and DNN and other analysis and push calculations. Based on these basic machine learning models, the real-time online and offline data of the teaching resources cloud platform is used as the basis, and various analysis and calculation tools are utilized to carry out the analysis of multiple indicators, such as click rate, response rate, browsing length, user likes, user replies, etc.

3.2.2. Massive data processing techniques

In this paper, we utilize weight based consistent hash algorithm for storage load distribution. Consistent hash algorithm is a hash algorithm for distributed systems, which can map multiple server nodes to a hash ring and map data to the corresponding nodes according to the hash value of the data, so as to realize the allocation of data storage or processing tasks. Consistent hash algorithm is an extension of the hash algorithm, commonly used to solve load balancing, can be flexible and reasonable allocation of storage resources.

Weight-based consistent hash algorithm is based on the basis of virtual node-based consistent hash algorithm, each server node is assigned a weight value. The weight value can reflect the server node's processing capacity, storage capacity and other performance indicators, and then in the hashing algorithm, the number of virtual nodes that each node is mapped to the ring space is correlated with its weight value, so that the server node with better performance can process more data.

This node proposes to allocate the storage load according to the performance size of each slice. The inter-slice blockchain request allocation is shown in Fig. 2, demonstrating the task of allocating storage load to each slice based on the weight consistency algorithm.

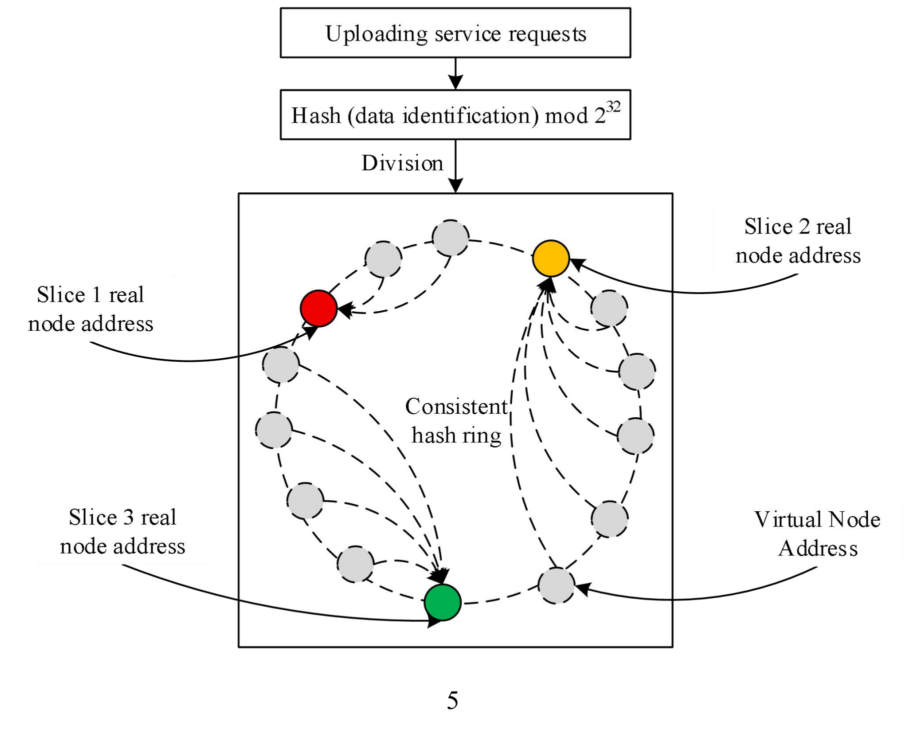

Figure 2. Block chain request allocation

The specific design is as follows:

(1) Design of virtual and real nodes in hash ring

In this paper, each slice in the edge blockchain layer is regarded as a real node, and the number of slices s is the number of real nodes, numbered as $R_l, R_2, \ldots, R_s$. Set the total number of virtual nodes f, numbered as $V_l, V_2, \ldots, V_m$, and distribute them into a hash ring of $0 \sim 2^{32} - 1$.

(2) Design of comprehensive evaluation of slice performance

Since the performance of the nodes inside the slice is similar, this paper takes the average value of the storage space, the average value of the computation capacity, and the average value of the communication delay between nodes of all the various nodes inside each slice as the indicators for the comprehensive evaluation of the slice. First of all, it is necessary to calculate the values of each metric for evaluating the slice using equation (1) and do normalization using equation (2). Namely:

$$\begin{cases} \overline{M_r} = \dfrac{\sum_{i=1}^{n} M_i}{n} \\ \overline{C_r} = \dfrac{\sum_{i=1}^{n} C_i}{n} \\ \overline{D_r} = \dfrac{\sum_{j=1}^{e} D_j}{e} \end{cases} \tag{1}$$

$$X'_{rm} = \frac{X_{rm} - \min\{X_{1m}, \ldots, X_{sm}\}}{\max\{X_{1m}, \ldots, X_{sm}\} - \min\{X_{1m}, \ldots, X_{sm}\}} \tag{2}$$

In equation (1), $\overline{M_r}, \overline{C_r}$ and $\overline{D_r}$ represent the average values of storage space, computational power, and intra-slice communication latency of the r th slice, respectively, n is the number of nodes in the r th slice, e is the number of edges between two nodes in the r th slice. X_{rm} represents the initial value of the m th component metric of the r th slice, and X'_{rm} represents the result after normalization of X_{rm}.

After that, it goes through the determination of the weight of each indicator of the evaluation slice p_{rm}, the calculation of entropy value e_m and the calculation of information entropy redundancy zm. The formula for determining the weight of each indicator is:

$$p_{rm} = \frac{X'_{rm}}{\sum_{r=1}^{s} X'_{rm}} \tag{3}$$

The entropy value is calculated by the formula:

$$e_m = -l \sum_{r=1}^{s} p_{rm} \ln p_{rm} \left(l = \frac{1}{\ln s}, l > 0, e_m \geq 0 \right) \tag{4}$$

Information entropy redundancy formula:

$$z_m = 1 - e_m \tag{5}$$

Through the above calculations, this paper can determine the weights γ_x of each indicator:

$$\gamma_m = \frac{z_m}{\sum_{m=1}^{3} z_m} \tag{6}$$

Further, this paper derives a composite evaluation score S_r for each slice:

$$Sc_r = \sum_{m=1}^{3} \gamma_m p_m \tag{7}$$

In the process of slicing, this paper has adjusted the corresponding weights to divide the nodes according to the specific needs of the system accordingly. In this session, it is only necessary to do objective evaluation of each slice based on the slicing results using the entropy weight determination method.

(3) Virtual node allocation design based on comprehensive evaluation of slice performance

In this paper, using the comprehensive evaluation score of each slice as a percentage of the sum of all slice scores as a coefficient, calculate the number of virtual nodes for each real node, so as to realize the on-demand adjustment of virtual nodes and real nodes mapping solution, as shown in Eq:

$$N_r = \left\lfloor f \times \frac{Sc_r}{\sum_0^a Sc_r} \right\rfloor \tag{8}$$

where N_r is the number of virtual nodes assigned to the r th slice in the hash ring, and its value is taken as the largest integer of the calculation result. Due to the deviation between the theoretically calculated value and the actual division, and when the number of virtual nodes is much more than the number of real nodes, the number of virtual nodes actually assigned is similar to the theoretically calculated value, so that the difference between the number of virtual nodes corresponding to the real nodes of the slices with similar scores is not more than one.

3.2.3. Multidimensional data analysis push technology

(1) Multilayer perception model

The multilayer perception model is an improved model of perception algorithms, i.e., it has multiple neural network metacellular layers, and the advantage that comes with multiple layers is that it allows for the nonlinear part of the data to be processed. The multilayer perception (MLP) model consists of an input layer, a hidden layer and an output structural layer, and at the macro level, the connectivity part of the model can be divided into a fully connected layer and a classifier. The convolutional multiplication part consumes more resources at both spatial and temporal levels, while the multilayer perception model plays a key role in the predictive scoring part. This model replaces the convolutional multiplication part of the predictive scoring in the original collaborative recommendation model, which saves computation time and improves the computational efficiency of the model.

(2) Push modeling framework

The deep neural network-based push model framework for educational information is shown in Figure 3.

The model can be divided into two parts, namely the data training part and the recommendation algorithm part. The data training part is the data capture, integration and processing of the target course platform data, as well as the feature processing of the captured data. The recommendation algorithm is the process of processing and making personalized resource recommendation after data training.

In the model framework designed in the paper, the input part is learner information, learning resource attribute information and learning resource text information. These 3 kinds of information are processed through the input layer of the neural network, and the text information is processed using the word vector model, and then the corresponding feature vectors of the 3 kinds of information can be obtained.

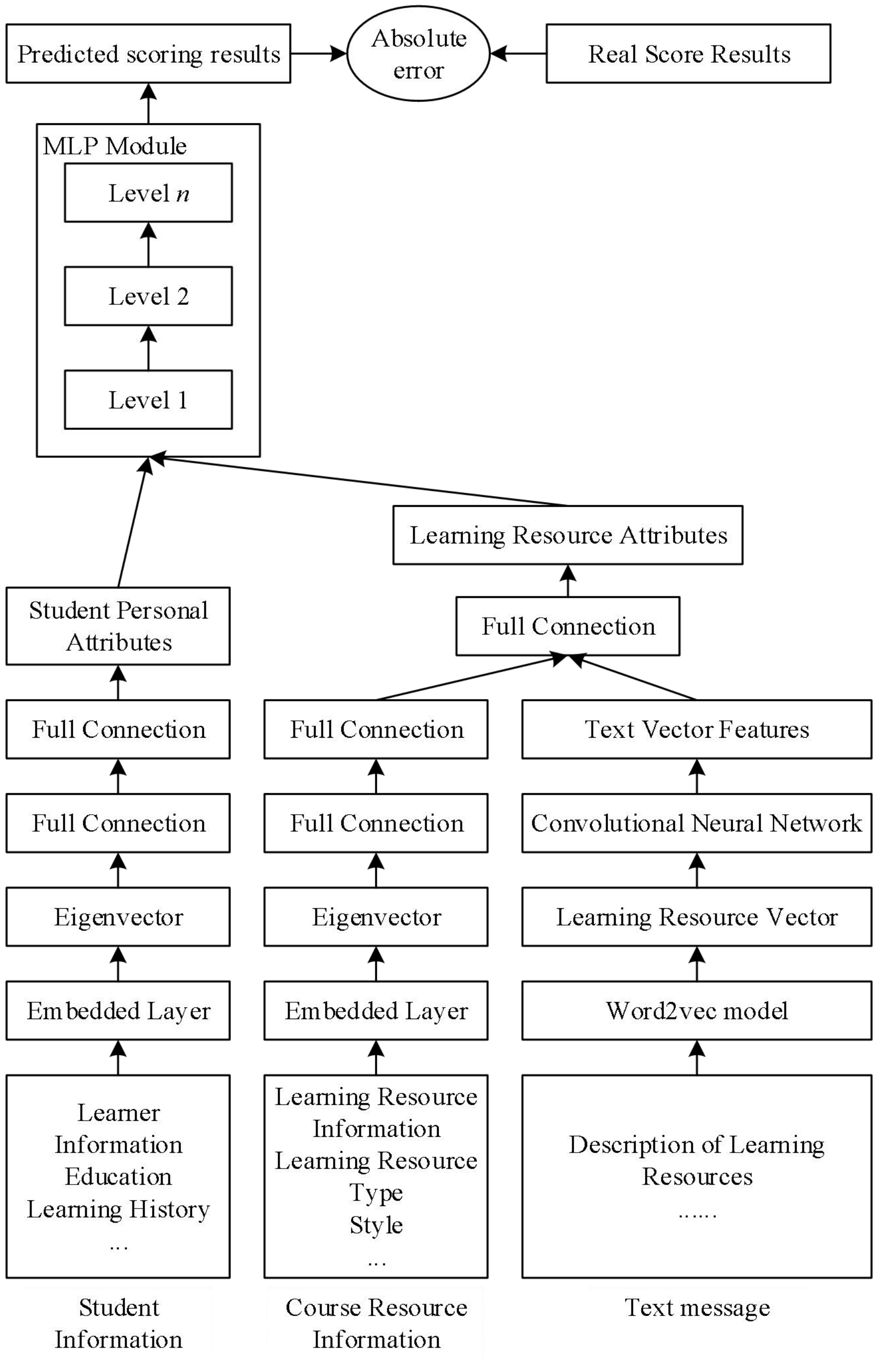

Figure 3. The education information push model framework of the deep neural network

In the learning evaluation phase, the multilayer perceptual algorithm model described above is used. The model has multiple neural network metacellular layers inside the model, which can effectively improve the evaluation speed of the model, and finally the model is scored by the multilayer perception algorithm model. The course resources are recommended according to the scoring weights, and learning resources that match the students' information characteristics can be recommended to the students. The model execution process is shown below:

Step1: Information input process. As shown in the bottom part of the above figure, the model first inputs learner information, learning resource attribute information and learning resource text information, and obtains the feature vectors of these three kinds of information. The feature vector of learner information is set as $h=\{h_1,h_2,\cdots,h_n\},h_n$ as a component of learner information, e.g., h_1 as learner's academic degree. Similarly, the learning resource attribute information is set as $i=\{i_1,i_2,\cdots,i_n\}$.

The feature vector calculation formula is:

$$\bar{h} = f\left(w_1 h + a_1\right) \tag{9}$$

$$\bar{i} = f\left(w_2 i + a_2\right) \tag{10}$$

In Eqs. (9) and (10), w_1 and w_2 are the weights occupied by the vectors, a_1 and a_2 are the bias of the vectors, and the f function is the activation function. The above weights are synthesized to determine the eigenvectors:

$$u_i = concate(\bar{h}) \tag{11}$$

The feature vector of the learning resource is:

$$s_i = concate(\bar{i}) \tag{12}$$

Step2: Neural network construction. In the model of the paper, the text information of learning resources should be acquired by neural network, and the model uses Word2vec method to acquire word vectors. Firstly, the text features are extracted by the word vector model, and then the text feature data are input into the neural network as the input layer for training, and the neural network model contains three layers: the input layer, the convolutional calculation layer and the pooling connection layer. Among them, the activation function of the input layer uses the linear unit activation function:

$$f(x) = \max(0, x) \tag{13}$$

In addition, the model in the training process will appear excessive use of training samples phenomenon, the phenomenon may make the recognition of new data worse. Therefore, it is still necessary to construct the cost function, and the use of quadratic function model can be added to the regular algorithm, so that the function to achieve the appropriate fit, fitting algorithm cost function is as follows:

$$C(\omega, b) = \frac{1}{2n}\sum_{x}\left\| y(x) - a^L(x)\right\|^2 + \frac{\lambda}{2n} \tag{14}$$

where C is the cost function, x, y are the sample and actual values, respectively, and L is the number of layers used to the neural network.

In the output layer design, the most mainstream regression function is used for construction. The structure of the neural network model is completed.

Step3: Evaluation criteria. The paper uses statistical methods to evaluate the accuracy of the algorithm implementation, using the absolute error algorithm to evaluate the performance of the recommendation model, which is also the most commonly used evaluation method in the current recommendation algorithm. The algorithm is statistically analyzed by the system recommendation data index and the actual user's preference index, and the analysis formula is:

$$E' = \frac{1}{m}\sum_{i=1}^{m}\left|P_i - R_i\right| \tag{15}$$

Where E' is the evaluation score, the smaller the value of E', i.e., the lower the absolute error, the better the recommendation performance of the model.

4. Modern educational development supported by machine technology

4.1. Simulation analysis of data storage based on improved algorithm

Five physical hosts were used as the host nodes of the server, which were initialized for the experiment and 215 simulated signals were used as input data. Subsequently, the hash algorithm is used to calculate the hash of the input data of each node and map its hash value on the hash ring. The assigned numbers of host node 1, host node 2, host node 3, host node 4, and host node 5 are 58, 25, 46, 52, and 34.The distribution of host nodes in the current system is not uniform enough, and there is a deviation in the assigned number of each host node, so there is a hash offset phenomenon.

4.1.1. Assigning the number of nodes simulation test

Set the index coefficients a_c , a_m of each index of the host's initialized performance index P to 0.4, 0.6, and for the different performances of each host, compute to obtain the weights W_i for each host, i.e.

$$\begin{cases} N = N_1 + N_2 + \ldots + N_i \\ N_1 : N_2 : \ldots : N_i = W_1 : W_2 : \ldots : W_i \end{cases} \tag{16}$$

W_i takes a positive integer and sets the number of virtual nodes according to the weights. The total number of host nodes is N , $\{Ni\}$ is the number of nodes of the first i host, then the number of virtual nodes added to each host is $Ni-1$. The number of virtual nodes of each host is set by the weights, and the indicators are shown in Table 1. When the number of servers is 5, the CPU and memory occupancy is 15.03% and 28.3%, the host initialization performance indicator P is 25.8, and the host weight W_i is 1.

Table 1. Various points

Server	**CPU Occupancy rate/%**	**Memory occupancy rate/%**	P	W_i	**Node number** N_i	**Number of virtual nodes**
1	9.87	36.2	24.7	3	$2n$	$2n-1$
2	16.25	30.1	28.9	3	$2n$	$2n-1$
3	18.03	81.6	42.6	2	n	$n-1$
4	22.62	60.4	30.7	1	$2n$	$n-1$
5	15.03	28.3	25.8	1	$2n$	$n-1$

According to 3:2:2:2:2:1 set the number of nodes of each host, when the total number of server nodes is 5, 10, 15, 20, 25, 30, the load balancing evaluation index of the system is calculated to get the load balancing evaluation index of the system in the case of different number of server nodes S . When the number of virtual nodes increases to a certain extent, the increase in the number of virtual nodes becomes less and less useful for system balancing. The threshold value of the initialized load balancing evaluation index S is set to 0.1 in the system, and when S is lower than 0.1, the system load balancing is judged to be good.

In this experiment, the number of server nodes with S values less than 0.1 are 20, 25, and 30. The number of server nodes 20, 25, and 30 are assigned the number of nodes based on the weight ratio 3:2:2:2:2:1, and are analyzed in comparison with the traditional consistent hash algorithm that distributes the number of nodes of each host evenly. The virtual node allocation results are shown in Figure 4. Taking the number of nodes as 20 as an example, according to the weight ratio 3:2:2:2:2:1 for the number of nodes allocation, the virtual node allocation results of hosts 1-5 are 9, 6, 6, 6, and 3.

It can be seen that when the number of virtual nodes is allocated evenly by the consistent hash algorithm, the storage data is stored in each node in a comparable amount. The number of virtual nodes allocated for hosts 1-5 are all 6.

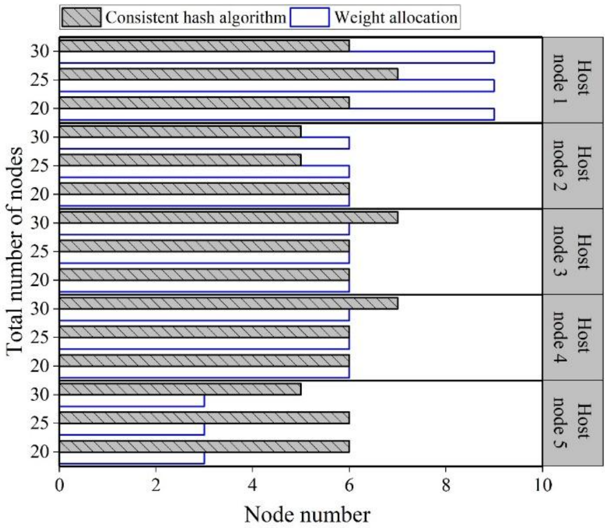

Figure 4. Virtual node distribution results

Load balancing indicators S calculated as shown in Table 2. Traditional consistent hash algorithm in the average distribution of nodes, the system load indicator S are more than the set threshold 0.1, at this time, the system has a load imbalance problem, while the improved allocation method S are less than 0.1, the total number of nodes is 20, 25, 30, S were 0.0783, 0.0854, 0.0937, weighted consistency of the hash algorithm exhibits good load balancing.

Table 2. Load balancing index S calculation results

Total number of nodes	**20**	**25**	**30**
Traditional consistent hash algorithm	0.1869	0.2431	0.2805
Weight consistency hash algorithm	0.0783	0.0854	0.0937

4.1.2. Load Balancing Dynamic Adjustment Simulation Experiments

The load dynamic adjustment mechanism is set to trigger the dynamic allocation function when the system load evaluation index is greater than the set threshold value of 0.1, completing one or more dynamic allocations to make the system load evaluation index lower than 0.1.

In this simulation test, the number of server nodes with S values less than 0.1 are 20, 25 and 30, and under the premise of realizing demand balancing, the smaller the number of host virtual nodes, the better, the number of server nodes of 20 is chosen as the initialization setting to initialize the system. Input simulation test data for load balancing dynamic adjustment test, according to the threshold value to trigger the dynamic allocation mechanism, until the system reaches the normal operating state, that is, the system load balancing evaluation index S is lower than 0.1. The indicators during the test are shown in Table 3, and the total number of tasks is 215.

The number of trials 1 indicates that the system starts to run, at this time the system load evaluation index S is less than the threshold value of 0.1, the system is running normally. Trial number 2 shows that the system load evaluation indicator S at this time exceeds the threshold value of 0.1, and the system activates the pre-set dynamic allocation mechanism to subtract 1 from the number of host nodes with the largest host load indicator L, and to add 1 to the number of host nodes with the smallest L, and the 3rd trial is obtained. The system load indicator $S=0.09<0.1$ in trial number 3, and the system operates normally.

Table 3. The indicators in the test process

Test	Server	Number of nodes	Task quantity	CPU Occupancy rate/%	Memory occupancy rate/%	Task ratio /%	*L*	*S*
	Host 1	9	36	12	32	21	23	
	Host 2	6	57	17	30	23	24	
1	Host 3	6	42	15	21	15	27	0.06
	Host 4	6	51	21	26	26	11	
	Host 5	3	29	14	30	15	15	
	Host 1	9	32	13	29	26	26	
	Host 2	6	36	14	34	25	24	
2	Host 3	6	47	15	18	21	19	0.17
	Host 4	6	54	17	25	14	12	
	Host 5	3	46	20	33	14	19	
	Host 1	9	67	15	30	20	23	
	Host 2	6	24	16	30	25	24	
3	Host 3	6	16	12	25	21	15	0.09
	Host 4	6	31	14	26	13	16	
	Host 5	3	77	22	28	21	22	

Monitoring the changes in the indicators in the dynamic allocation of tasks is shown in Figure 5, which illustrates the changes in the number of tasks, CPU occupancy %, memory occupancy/%, percentage of tasks/%, host load indicator L, and system load indicator S in the three trials.

It can be seen that in test 3, host 5 has the largest cumulative value of each indicator, host 5 has 77 tasks, 22% CPU occupancy, memory occupancy = 28%, percentage of tasks = 21%, and host load indicator L = 22. Combined with the results in the table above, the system load indicator S is 0.09, and this simulation test shows that, during the system operation, this dynamic adjustment mechanism can make the system run normally and smoothly, realizing the load balance during the system operation.

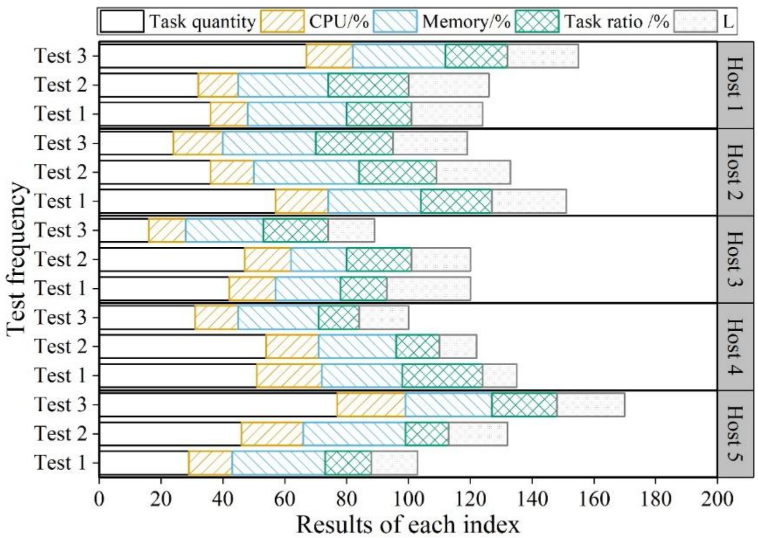

Figure 5. Changes in the performance of the tasks in dynamic distribution

4.2. The Role of Intelligent Push Algorithms in Modern Teaching and Learning

This paper proposes the hypothesis that the use of an algorithmically recommended instructional platform produces a higher level of instructional experience, including an immediate interactive experience, a knowledge mastery experience, and a focused concentration experience, compared to a traditional platform. A questionnaire survey was conducted to investigate the experiences of different users of the algorithm-recommended teaching platform and the traditional teaching platform, and to measure the three dimensions of the designed teaching experience: "immediate interaction", "knowledge control", and "concentration". Converting the three constructs into easy-to-understand questions, “Instant Interaction” has a sense of interaction, with the platform being able to give timely feedback. “Knowledge control” has a sense of control, with full control over the platform's knowledge. “Concentration” has a sense of concentration and focus. A 5-level Likert scale is used for measurement and scoring, ranging from 1-5, which indicates that it is very inconspicuous to very obvious.

The questionnaire survey was conducted by network survey, the questionnaire was released in the questionnaire star platform, the survey time lasted for one week, a total of 240 questionnaires were recovered, and all the recovered questionnaires were valid questionnaires. The questionnaire scale was tested for reliability and validity, and the questionnaire had good reliability and validity and could be analyzed.

In order to test the hypotheses, t-tests were conducted for the variables platform type and teaching experience level. It was found that the teaching experience and its various constructs did not reflect significant variability across platform types, and the descriptive statistics and independent samples t-tests for platform types at the level of teaching experience are shown in Table 4.

Between the algorithmic and traditional platforms, the t-test quantification of the teaching experience was 1.317 with a significance chance of 0.047, the two values of the immediate interactive experience were 0.339 and 0.019, the control and ease of experience was 1.106 and 0.023, and the focus and forgetfulness experience was -0.015 and 0.016, and none of them reached the level of significance of greater than 0.05. Therefore, the hypothesis is valid that the use of algorithmically recommended teaching platforms produces a higher level of teaching experience, including immediate interactive experience, knowledge mastery experience, and focused concentration experience, compared with traditional platforms. Modern teaching platforms based on deep neural network-based educational information push modeling can give learners a better teaching and learning experience, and can contribute to the development of education better than traditional education methods.

Table 4. Describe the statistics and the independent sample t test

Type	Platform	Number	Average	Standard deviation	t	Significance (double tail)
Instant interaction	Algorithm platform	152	3.841	0.707	0.339	0.019
	Traditional platform	88	3.022	0.849		
Knowledge control	Algorithm platform	152	3.654	1.035	1.106	0.023
	Traditional platform	88	3.139	1.122		
Focus	Algorithm platform	152	3.547	0.951	-0.015	0.016
	Traditional platform	88	3.022	0.979		
Teaching experience	Algorithm platform	152	3.679	0.914	1.317	0.047
	Traditional platform	88	3.052	0.962		

4.3. Teaching effectiveness of modern and traditional education

In this paper, in the teaching of industrial robot programming and debugging course in September-December 2023, students of programming major of a university in Taiwan in the class of 2023 were selected as the research object, programming A and B classes (total 85) as the experimental group, and programming C and D classes (total 90) as the control group, and the enrollment scores, ages, and genders of students in the two groups were compared, and there was no statistically significant difference (P>0.05), and the offline teaching conditions, teacher qualifications and equipped facilities are the same.

Experimental group: online and offline blended teaching based on online open courses is adopted. Teachers first built teaching-related resources on the classroom platform, including the overall introduction of the course, course standards, lesson plans, lesson plans, teaching courseware, teaching videos, chapter practice questions, quizzes, homework, etc. The course was taught in a closed-loop teaching mode with a “double-loop” approach.

Control group: offline teaching, i.e. face-to-face teaching method relying on classroom multimedia. Teachers prepare lessons before class, prepare courseware and display it in the classroom. Teachers teach on the podium, and students sit down to learn knowledge.

The teaching effect of the two groups of students was analyzed as shown in Figure 6.

The results of the questionnaire survey show that the students in the experimental group evaluated the online-offline hybrid teaching as follows: the satisfaction of this teaching method is 95.25%. More than 90% of the students in the experimental group think that the blended teaching based on online open courses can improve students' independent learning ability, enhance students' interest, deepen their understanding of theoretical knowledge, strengthen students' operational ability, improve their ability to learn and filter teaching resources, as well as their ability to analyze and solve problems.

In traditional education, the lack of teaching resources in the course leads to students failing to successfully discriminate and filter teaching resources, and their ability to handle teaching resources is only 74.01%.

The experimental group's students' satisfaction with online-offline blended teaching, independent learning ability, learning interest, learning motivation, understanding and memorization of theoretical knowledge, and analyzing and problem-solving ability were significantly higher than those of the control group.

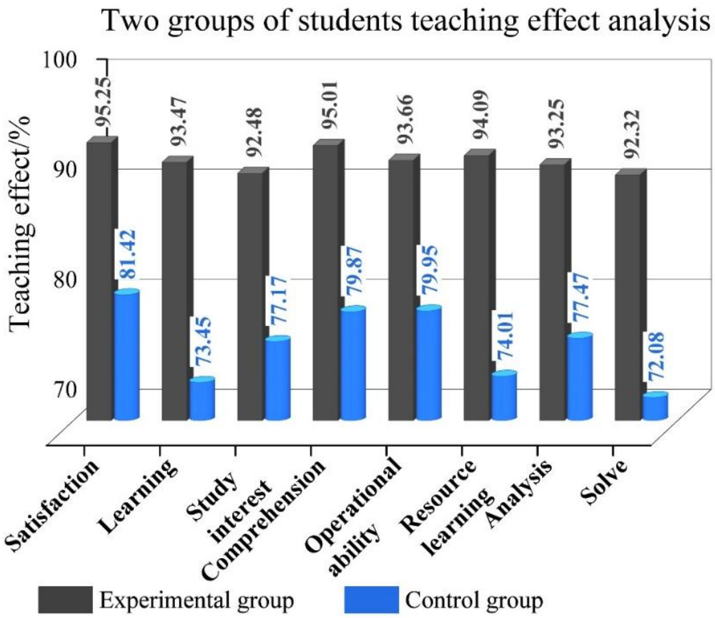

Figure 6. The teaching effect of the two groups was analyzed

Comparison of the examination scores of the industrial robot programming and commissioning course of the two groups of students is shown in Table 5. Statistical analysis of the examination results shows that the total score of the students in the experimental group is 83.86±4.91, and the score of the operation questions is 38.29±3.57.

The final exam subjective scores, operational questions, and total scores of the students in the experimental group were significantly higher than those of the control group, and the difference was statistically significant ($P < 0.05$), and the comparison of objective scores between the two groups was not statistically significant ($P = 0.230 > 0.05$).

In the course of industrial robot programming and debugging, which emphasizes practical operation and coding, the scores of coding operation of students in the experimental group are 5.74 points higher than those of students in traditional education, indicating that the use of machine technology in modern education can accelerate the technical achievement of students, enhance the practical ability of students, and satisfy the requirements of the modern society for students, and that the teaching and learning development driven by machine technology is in line with the modern society's educational The development of teaching driven by machine technology is in line with the educational values of modern society. The results of traditional education are in conflict with the demand for technical talents in modern society.

Table 5. Comparison of students' course test results in two groups

Group	N	Objective question/(25)	Subjective problem/(25)	Operating problem/(50)	Total score
Experimental group	85	23.10 ± 3.54	22.47 ± 3.77	38.29 ± 3.57	83.86 ± 4.91
Control group	90	18.56 ± 4.91	20.64 ± 3.52	32.55 ± 3.04	71.75 ± 6.37
t value	-	3.19	6.72	4.65	9.12
P value	-	0.230	0.001	0.003	0.000

5. Conclusion

This paper analyzes the hybrid teaching mode and the construction of teaching resources under the support of machine technology in the modern society, and uses a questionnaire survey to analyze the achievements of Taiwanese students in the course of programming and debugging of industrial robots under the modern teaching mode and the traditional education, and tries to analyze the development of traditional education in the development of the modern society from the course achievements.

(1) Storage load allocation by the weight-based consistent hash algorithm makes the number of virtual nodes assigned more evenly, when the total number of nodes is 20, the number of virtual nodes assigned to each host is 6, S = 0.0783<0.1, showing good load balance. The number of server nodes is 20 as the initialization setting to initialize the system, at this time, the total number of tasks of each host is 215, the host load indicator L is 27 at the maximum, and the system load evaluation indicator S is 0.06, the system is running normally, the resource data is handled properly, and it can satisfy the multi-resource task allocation of the online open course, which can realize the large-scale students' resource demand.

(2) The online open courses supported by the deep neural network-based educational information push model can give students a better learning experience, and the mean values of instant interaction of the algorithmic recommendation platform and the traditional platform are 3.841 and 3.022, respectively, and the means of the algorithmic recommendation platform and the traditional platform are significantly different in the aspects of instant interaction, knowledge control, and concentration. The rapid development of machine technology and other technologies in modern society, the use of technology in teaching means the renewal of education, the use of deep neural network-based educational information push model for platform online resource push to promote the effectiveness of high-quality education.

(3) The experimental group utilizes the blended teaching of online open courses, and there is a significant difference between the performance of the experimental group and the control group utilizing traditional education in terms of subjective questions, practical questions, and total scores. The neglect of practical operation in traditional education is contrary to the demand of modern society for technical talents and highly sophisticated talents, while advanced technology such as machine technology gives teaching modernization and intelligence, which is more capable of generating professionals in line with the needs of modern society.

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