

# Teaching Quality of Ideological and Political Education in Colleges Based on Deep Learning

Hao Di, School of General Education, Cangzhou Jiaotong College, Huanghua, China

Hui Zhang, Transportation and Economic Research Institute, China Academy of Railway Sciences Co., Ltd., China

Ping Li, School of Economics and Management, Cangzhou Jiaotong College, Huanghua, China\*

## ABSTRACT

As the current level of higher education in China improves, so too do higher education courses. The key to improving the quality of higher education in China is to improve teaching quality (TQ), while the key to improving the quality of higher education and teaching in China is the key to higher education. It is therefore necessary to formulate and finalize a system of quality assessment of higher education in order to manage higher education. The article aims to analyze the quality of ideological and political (IAP) education in colleges based on deep learning. It analyzes TQ in IOP courses in colleges, the role of quality assessment education, problems in the quality assessment system of teaching, and problems in the design of IAP quality education assessment. Based on the principles to be followed by the referral system, an IAP quality TQ assessment system has been developed and the MATLAB simulation software is based on the teaching network quality evaluation model and test model based on the TQ.

## KEYWORDS

Deep Learning, Ideological and Political Education, Neural Network, Teaching Quality Evaluation

## INTRODUCTION

As one of the important tools to ensure and promote the continuous improvement of higher education quality, higher education quality evaluation is to conduct in-depth research, effective management and big data analysis of the large amount of raw data received by colleges in the teaching process, which can be used to evaluate TQ. And the introduction of the corresponding improvement measures to provide decision-making support (Lin & Chen, 2020; Erdem et al., 2020).

With the development of computer and information technology, many scholars use mathematical models to directly establish educational quality evaluation systems, especially fuzzy comprehensive evaluation methods, cluster analysis, analytic hierarchy, and gray systems. Fuzzy comprehensive

DOI: 10.4018/IJeC.316829

\*Corresponding Author

This article published as an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and production in any medium, provided the author of the original work and original publication source are properly credited.

evaluation (FCE) is a synthesized appraisal approach based on fuzzified logic, as well as the discussed from the perspective is realistic and dependable, making it extensively utilized in the petrochemical, architecture, and other areas. The AHP's three primary roles are (1) organizing sophistication, (2) evaluating on a quantitative approach, and (3) synthesizing, and these are the simplest theories to interpret. The grey systems approach is a novel paradigm for studying issues with images obtained and little knowledge. As a result, the functional behaviors of organizations and underlying rules of development may be accurately characterized and observed. Some scholars use the fuzzy set 2-type multi-level model to evaluate TQ. Type-2 fuzzy logic is an extension of standard inductive inference (type-1) in the perspective that ambiguity is inherent not just in the formulation of the attribute values and also in the input parameters. Some scholars apply the analytic hierarchy process and neural network to the education quality evaluation model (Imran, (2019); Zhang, (2020)). Some researchers combine the fuzzy analytic hierarchy process with the fuzzy overall evaluation method to provide a quality evaluation model for higher education managers and another tool for improving TQ (Peng, (2020); Li, (2021)). Fuzzy Analytic Hierarchy Process (FAHP) is a fuzzy logic-based Analytic Hierarchy Process (AHP) approach. The fuzzy AHP approach is comparable to the Evaluation criteria. The Fuzzy AHP approach simply converts the AHP scaling into a fuzzy triangle level that may be accessible first. Some researchers also use the TOPSIS method of multi-functional decision-making to evaluate TQ (Zureck, 2021; Long & Zhao, 2020). Among the analytical models of multi-criteria strategic planning is TOPSIS (Technique for Order Preference by Similarity to Ideal Solution). This is an approach that may be used in a variety of situations and is based on an appropriate statistical concept. Moreover, it is a very realistic strategy that relies on specialized software. The key premise is that the selected option must be closest to the fitness value and furthest away from the negative optimization task. Farthest away from the negative effective solution. Deciding based on several factors. In short, the advantage of the above method is that it considers various evaluation factors and combines the experience and knowledge of experts. The disadvantage is that the evaluation process without considering the evaluation indicators is random and subjective, and the non-linear relationship of the evaluation results is very subjective, so it does not really reflect TQ. In recent years, many researchers have used neural network technology to evaluate educational quality evaluation models (Fernandez et al., 2013). Neural networks are used in the field of prediction. Two scholars use programs to simulate neural networks, learn knowledge of data samples, and predict nonlinear data in a computer environment (Du, 2020; Mbise, 2021). Some scholars apply the BP neural network algorithm to evaluate TQ. It's a common method for teaching convolutional neural networks. This approach is useful for considering all the factors of a damaged system with regard to all of the platform's values. In addition, a researcher used the BP neural network method to establish a model of the education quality evaluation system in colleges, quantifying the educational achievements as the output, taking the meaning of the education evaluation indicators of specific data as the input, and the teaching effect as the output (Niet et al., 2016; Ahmad et al., 2021; Tang et al., 2020). Using MATLAB for empirical research, the application of this method in education quality evaluation can surpass the subjectivity of expert evaluation, and the results are relatively accurate. This method has good application value.

On the basis of consulting a large number of relevant references, this paper combines the related content of TQ evaluation to give an IAP education TQ evaluation model developed using deep learning technology, and a deep neural network established through MATLAB and other simulation software systems. The organic integration of various data analysis results allows more accurate assessment of quality, so it has considerable practicability.

## **THE TQ OF IAP EDUCATION IN COLLEGES BASED ON DEEP LEARNING**

Problems in the TQ of IAP Courses in Colleges

1. The teaching content lacks divergence:

The teaching content contains less divergent knowledge. In the process of education, teachers of IAP theory courses often only focus on explaining the basic content of educational requirements, while ignoring the education of different knowledge under the pressure of curriculum tasks (Feng, 2020). The essence of the communist building is ideological and political (IAP) education. Higher education institutions have an instructional role to play in the nurturing of the “Four Haves” in the pursuit of socialism building. In the instruction of IAP theory classes, nevertheless, a standardized, rigorous, methodical, as well as realistic assessment indicator process is vital. The goals are to use Digital software to manage the ideological and political (IAP) school teaching method, to fully utilize the software devices under advanced analytics (BD), to enhance the functioning of IAP learning, as well as to gain a comprehensive development of participants’ operational requirements for the IAP classroom. Ideological and political education is defined as the deliberate, scheduled, as well as the organized impact of some of these concepts, personal leanings, as well as ethical codes on people in a social or peer situation so that they develop the philosophical and ethical qualifications needed by a given culture and category sociological phenomena interaction. In fact, IAP theory courses in colleges are a curriculum system that focuses on the construction of the ideological field. Unless it is thorough and comprehensive, the construction of the ideological field cannot be realized. The scientific guidance of teachers to improve students’ world outlook, outlook on life, and values should not be limited to the basics. In a theoretical study, only the combination of basic theory and divergent education can enable students to comprehensively learn theoretical knowledge, and at the same time effectively improve their thinking, and flexibly use the knowledge they have learned, in order to achieve the ultimate educational goal.

## 2. Students’ enthusiasm for participating in classroom teaching is unstable:

The instability of students’ enthusiasm for classroom participation indirectly affects teachers’ enthusiasm for education. Enabling them to manage a final project such as a discussion or a demonstration fuels their passion since they have been honing their skills throughout the semester. Permit learners to develop teams, select subjects, allocate responsibilities, and so on with minimal assistance. If students can actively participate, speak enthusiastically, and show a strong interest in what they have learned, they can also stimulate teachers’ enthusiasm for education. Under its influence, students can also participate more in learning. However, when students hold a completely disrespectful learning attitude, it will also have a significant impact on teachers’ teaching enthusiasm (Nieto et al., 2018; Cai, 2020; Liu et al., 2021). Therefore, under such adverse effects, educational activities are prone to a vicious circle, which affects the improvement of TQ. An enthused teacher instills interest, delight, and expectation in the classroom encourages pupils to participate, as well as encourages children to investigate. Educator passion can result in higher educational ratings, more favorable views to instructors, increased achievement of students, and successful classroom behavior. An enthused instructor infuses the classroom with enthusiasm, delight, and expectancy, and encourages individuals to participate as well as investigate. Educator passion can result in higher educational ratings, more favorable views of instructors, increased educational performance, and collaborative teaching behavior.

## 3. Practical teaching is out of touch with theoretical teaching:

Practical education is a teaching method to improve students’ understanding and application ability of theoretical knowledge. Its formulation and implementation are purposeful, focusing only on the teaching progress of theoretical courses and should be carried out in a planned way. However, although colleges have begun to arrange practical teaching links at this stage, they are often prone to mistakes in understanding and regard practical teaching and the second classroom as the same thing.

In fact, they are two completely different concepts. The second classroom only wants to carry out teaching outside the classroom through activities, and the essence is to further expand the content of classroom education. This is an important part of practical education, not an important tool to expand learning knowledge, stimulate students' interest and promote the educational process. Through the interpretation of the second classroom, it is not difficult to understand that it is not all the content, but only a field of practical education. It cannot be generalized. Practical education is a complex education link, and teachers need to provide comprehensive and targeted methods. Experiential activity can actually help students learn in the classroom. A realistic exercise can assist organize a course while also increasing student involvement and effective learning: Several kids learn more quickly when they are actively involved in learning. This is especially true in hands-on research knowledge. Only in this way can the results of practical education be fully reflected. The advantages of practical education are enhanced active learning and overall comprehension, also it has a greater impact. The strategies of practical teaching are teaching strategy, intermediate directions, contextual education, good communication skills, and progressive learning.

### **The Role of TQ Evaluation**

#### **1. TQ evaluation has a guiding role:**

The accuracy of program evaluations is critical for assessing instruction. In the quality evaluation process, clear evaluations, evaluation plans adopted, and indicators used can improve educational strategies and educational quality to a certain extent and play an important leading role in college teaching activities. The introduction of scientific and reasonable evaluation programs and indicators means that the factors related to education and learning are different from the emphasis on classroom education. These different parts promote the progress of the curriculum and demonstrate and realize their benefits in the curriculum to better reflect the evaluation.

#### **2. Evaluation of classroom TQ has an appraisal function:**

Education quality evaluation has the function of identifying the advantages and disadvantages of education quality. Appraisal system serves three purposes: (1) deliver relevant feedback on every organization's strength; (2) to satisfy as a foundation for adjusting or behavioral change to more accurate decisions; and (3) offering information to management with which they can evaluate potential employment tasks as well as remuneration. Through scientific and effective education evaluation activities, reasonable judgments can be made on teachers' attitudes, work quality, and educational abilities, so that the school's work can be systematically managed. Quality teaching does not merely qualify a learner for a career, but it also helps them improve their complete character. It focuses on full development for children, wherein ethical standards are emphasized as a graduation requirement to assist individuals to live independently.

#### **3. TQ evaluation has a feedback function:**

Educational quality evaluation can diagnose teachers' educational activities and provide feedback on measurement results, allowing educators to discover and solve problems in work in a timely manner, thereby guiding educators' teaching activities and ultimately making the goals of teaching activities more effective.

#### **4. TQ evaluation has a stimulating effect:**

In the process of evaluating TQ, teachers first need to clarify the strengths and weaknesses of their work, give teachers a certain degree of affirmation, make them feel extremely proud of their work results, and mobilize the enthusiasm of teaching workers. The second is to address the shortcomings and deficiencies of teachers in their work, clarify the direction of future efforts, and give negative evaluations so that they can learn from each other through lectures and evaluations, inspire the positive energy of educators, and encourage them to make continuous progress.

## **Problems in the Evaluation Index System of TQ**

### **1. The evaluation method is not objective enough:**

The standard system is the application of the quality approach. Consistency of data, priority, applicability, autonomy, maneuverability, and responsiveness must all be considered while choosing indications. As a result, there are three performance factors in this estimation: technological, financial, as well as different arrangements. In terms of student evaluation, individual students participate in the entire teacher's educational process. In all educational activities, students must be the most experienced and have the most say. Students can observe and feel the teacher's performance in the classroom. Therefore, the information provided by students is often very persuasive. However, student evaluation also has objective shortcomings. Once students have attitude problems with teachers, the evaluation results will inevitably be unfair and objective. Teacher self-evaluation allows teachers to discover and solve problems in the teaching process in time. There are also attitude problems in teacher self-evaluation, which often leads to non-objective evaluations. The disadvantage of teaching management evaluation is that education managers are not always at the forefront of education, so there are often doubts about the understanding of the education process, and the evaluation results are unfair. Development, age, desire, prior learning, IQ, emotional wellbeing, physiological requirement, feeding practices, concentration and enthusiasm, goal setting, as well as a level of desire are some of the aspects that influence education for students. Expert evaluation is a relatively reliable way to evaluate the quality of teacher education. The advantage is that professionals are people with rich educational experience, a wide range of knowledge, and a deep understanding of the problem, and the results of the evaluation will significantly improve education. The disadvantage of professional evaluation is that professionals tend to pay more attention to the general laws of teacher education, and often curb the development of teacher personality in teacher education, so as to improve teacher education results instead of making contributions.

### **2. The evaluation content is not complete:**

Generally speaking, the content of teacher education quality evaluation system generally includes educational attitude, scientific research ability, professional development and educational achievements. No matter what the problem is, a unified standard is adopted. As far as teaching evaluation is concerned, it always responds to changes in the same way. No matter what it is, the evaluation indicators are in line with this objective object, and the objectivity and scientificity of evaluation are lost. College English teaching quality assessment is a subset of teacher preparation performance evaluation. It describes classroom assessment as a procedure for exploring the scope of what programs, as well as instructional strategies, as well as instructional strategies, involve the collaboration of educational objectives based on core content and instructional concepts. In addition to classroom teaching, other factors also affect teachers' TQ, but they are not reflected in the indicators of the teacher's TQ evaluation system, and the indicator system is not perfect.

## **The Principles that should be Followed in Constructing the Evaluation Index System of IAP Education TQ**

### **1. The guiding principle:**

The phrase “differentiated instruction” refers to classroom instruction approaches that directly participate individuals in their own continuous improvement. Consider it as youngsters understanding how to learn instead of merely regurgitating knowledge or imitating the strategies of their instructors or peers. As a very important part of the classroom teaching process, evaluation has become an indispensable part of the teaching process. Therefore, the purpose of classroom teaching evaluation is to discover the progress and deficiencies of teachers in classroom teaching content, and teachers can find more suitable teaching methods by changing teaching and management methods. Therefore, the evaluation indicators of classroom TQ should be determined according to the goals and requirements described in the content outline of the textbook, combined with the education and training goals of various subjects under the background of quality education. This is very beneficial to the continuous progress of students and enables students to be fully developed in many aspects. And ultimately improve the overall quality of students.

### **2. The principle of objectivity and fairness:**

When evaluating the quality of classroom education, the constructed evaluation mechanism must conform to the characteristics and content of college education, and the indicators involved must ensure that TQ reaches the goal of scientific measurement. At the same time, it is necessary to take into account the differences in majors, subjects, and teachers’ basic level, and strive to be objective and fair, accurately and concisely reflecting the true level of classroom teaching.

### **3. The principle of simplicity and efficiency:**

In the process of school classroom teaching, teachers themselves are under great pressure. If the evaluation process is too strict and complicated, it will have a negative impact on the evaluator and the evaluated. Therefore, the evaluation method should be simple and applicable, easy to use in the education process, and make various indicators scientific and easy to use. Therefore, the selection of indicators should be as direct and specific as possible.

## **EXPERIMENT**

### **The Establishment of an Index System for Evaluating the Quality of IAP Education in Colleges**

In addition to establishing an assessment system for the TQ of IAP education in colleges, teachers’ basic qualities, correct pre-class preparation, correct teaching behaviors and various teaching methods will all be considered. It can effectively mobilize students’ learning motivation and bring Significant teaching effect. When involving student factors, students’ learning attitude should also be considered. At the same time, they should have clear learning motivation and full learning motivation. Therefore, students should be clear about their career plans and ensure that they have sufficient learning motivation. Teachers should actively introduce classroom discussions to increase student participation in the classroom, and at the same time strengthen the interaction between teachers and students in the classroom.

This article explores literature, uses quality assurance standards for teaching at other universities, analyzes the content and weight of the education system, and offers an evaluation model for OI on TQ. The evaluation index system of TQ is shown in Table 1.

## TQ Evaluation Model Based on Deep Neural Network

### 1. Determination of the number of floors:

Deep neural networks are particularly sensitive to network structures because different network structures can handle different problems. Neural networks have the opportunities to succeed on their own as well as create information that is not constrained by the source. Because the information is saved in its own channels rather than a repository, system failure has no effect on the system's operation. If the structure of the neural network is more complex, the ability to solve complex or unusual problems is stronger, but the training time is longer. And if the neural network structure is very simple, it will be difficult to gather network training time. Or it can be combined, but it will take a long time. Studies show that an increased number of hidden layers improves the network's ability to create maps and solve complex problems, but many hidden layers increase the network's learning time. The hidden neural network can access any continuous activity in the closed area, so a three-layer neural network can complement all n-dimensional to m-dimensional cartographies. Therefore, in a model for quality assessment of education based on a deep neural network, this article uses a three-layer neural network with a hidden layer. The parameters are (m, n), with the number of items corresponding to the number of training instances as well as the number of sectors corresponding to the number of synapses. The frequency of rows and columns correspond to the proportion of activation functions as well as neural network neurons, respectively.

### 2. Determination of the number of neurons in each layer:

Table 1. TQ Evaluation Index System

First-level evaluation index	Secondary evaluation index system	Index code
Teacher quality	Clear educational goals	X1
	firm professional knowledge	X2
	Explanation of teaching level	X3
Teaching attitude	Patiently consult and answer questions	X4
	Teach seriously	X5
	A rigorous attitude and the pursuit of perfection	X6
Teaching content	Concept theory is accurate	X7
	Rich in content, focus on ability	X8
	Combine content with practical applications	X9
Teaching method	Good at enlightening	X10
	Various ways	X11
	Teach students according to their aptitudes	X12
Teaching effect	Improve self-learning ability and learning interest	X13
	Mastery of basic knowledge	X14
	Ideological and moral quality improvement	X15

- (a) The number of neurons in the input layer depends on the size of the input vector. In this article, we know that the number of neurons at the input level of the IAP quality evaluation system is  $n = 15$ .

The number of neurons in the hidden layer can be determined with reference to specific empirical formulas, for example:

$$s = \sqrt{0.43mn + 0.12m^2 + 2.54n + 0.77m + 0.35} + 0.51 \quad (1)$$

Or

$$s = \sqrt{m + n} + a \quad (2)$$

Among them,  $a$  is constant between 1 and 10,  $n$  is the number of neurons in the input layer, and  $m$  is the number of neurons in the output layer.

According to the empirical formula, the number of neurons in the hidden layer is 4.

### 3. Determination of the number of neurons in output layer:

The TQ evaluation result is taken as the output of the network neuron, that is, the number of output layers is  $m=1$ .

### 4. Determination of neuron activation function:

An Activation Function determines rather or never a neuron is stimulated. This implies that it would use fewer algebraic calculations to determine even if the neuron's contribution towards the system is essential or not throughout the classification stage. It is mainly used as a mapping function because it has excellent nonlinear mapping characteristics due to the differentiation, simple differential type and simple representation of the sigmoid function. In this article, the neural network activation function uses the sigmoid function:

$$f(x) = \frac{1}{1 + \exp(-x)} \quad (3)$$

### 5. Selection of learning rate:

The degree of weight change generated in each training week is determined according to the learning efficiency. High learning rate will cause instability or divergence of the network system, low learning rate will cause too long training time and slow convergence of the network system, but we have been able to determine that the network error value will not be due to the partial jump below the error surface. And eventually tend to the smallest error value. Therefore, in general, it prefers to select a lower learning rate to ensure system stability. As a result, the verify process gives the fault for every block of data in the classification algorithm, which is then combined as well as calculated by the total of pieces of data in the testing dataset, yielding the expected mean deviation. When operating the system, nevertheless, the latency rarely exceeds 0.01.



In summary, the structure diagram of the TQ evaluation model based on deep neural network in this article is shown in Figure 1:

## EXPERIMENTAL DESIGN

1. Collect sample data:

In the IAP education and education quality evaluation system of colleges, the collection of input data information is the method of classroom evaluation, that is, the 15 secondary indicators of the student teacher IAP education TQ evaluation table are input into the IAP education teaching. In the quality evaluation system, in the education and education quality evaluation system, students are organized to evaluate IAP courses. The evaluation process requires each student to evaluate separately.

2. Processing sample data:

After selecting a suitable evaluation data sample, the data needs to be normalized before it can be input into the neural network. Due to the collected data, the values of various indicators input by the sample may have large differences, so it is necessary that the indicators are normalized so that small-value information will not be overwhelmed by large-value information. This article uses the maximum and minimum methods for normalization. To obtain popularity and recognition (or lowest), select the greatest (or weakest) of all the feature points (or depths) in the center, as well as the maximum (else minimum values) of the places on the outside. This is because this method performs a linear transformation on the data, which better retains its original meaning and will not cause information loss.

## DISCUSSION

The results after training with MATLAB are shown in Table 2 and Figure 2.

After the neural network is successfully trained, use the test data in `ceshidataIn.m` to test the trained network. After obtaining the output of the network, check whether the error between the

**Figure 1. TQ Evaluation Model based on deep neural network**

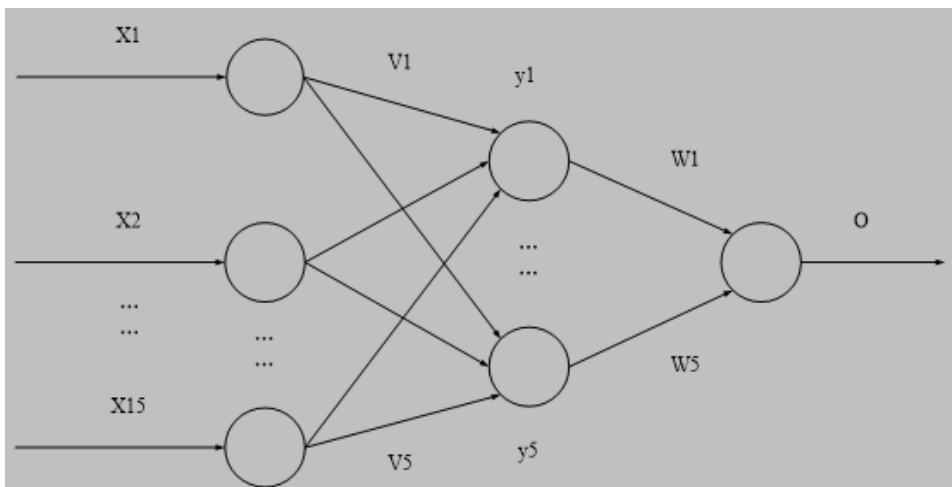
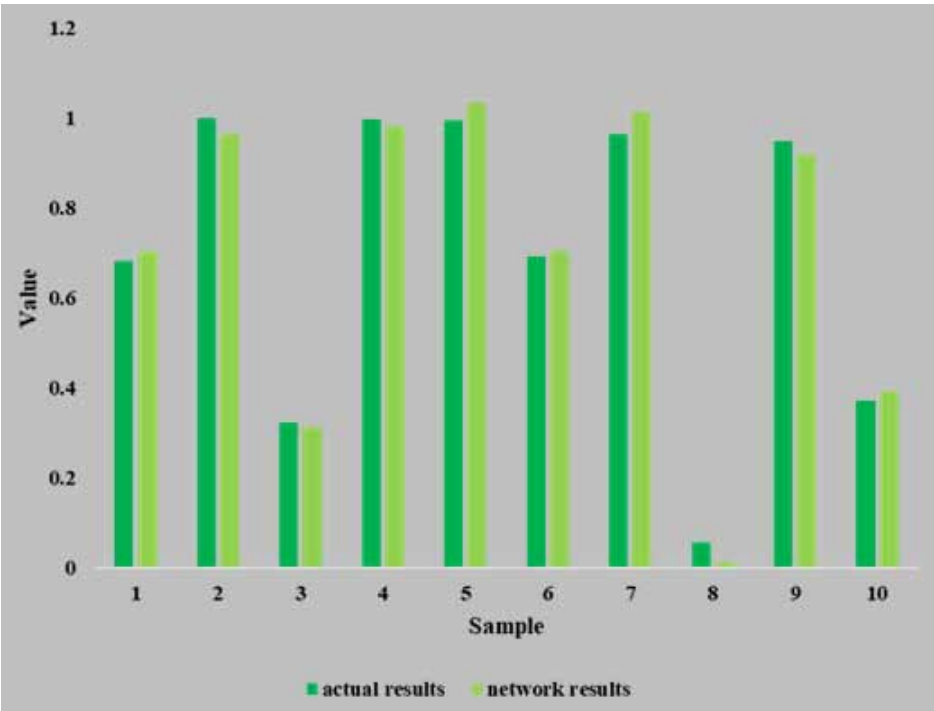


Table 2. Comparison of actual results of test data and network results

	actual results	network results
1	0.683	0.702
2	1	0.965
3	0.324	0.313
4	0.997	0.982
5	0.994	1.034
6	0.692	0.706
7	0.964	1.012
8	0.056	0.013
9	0.948	0.918
10	0.371	0.394

Figure 2. Comparison of actual results of test data and network results



output result  $N_{out}$  and the normalized actual result of  $ceshidata_{out}$ .  $m$  is within the required range. The test results are shown in Table 3 and Figure 3.

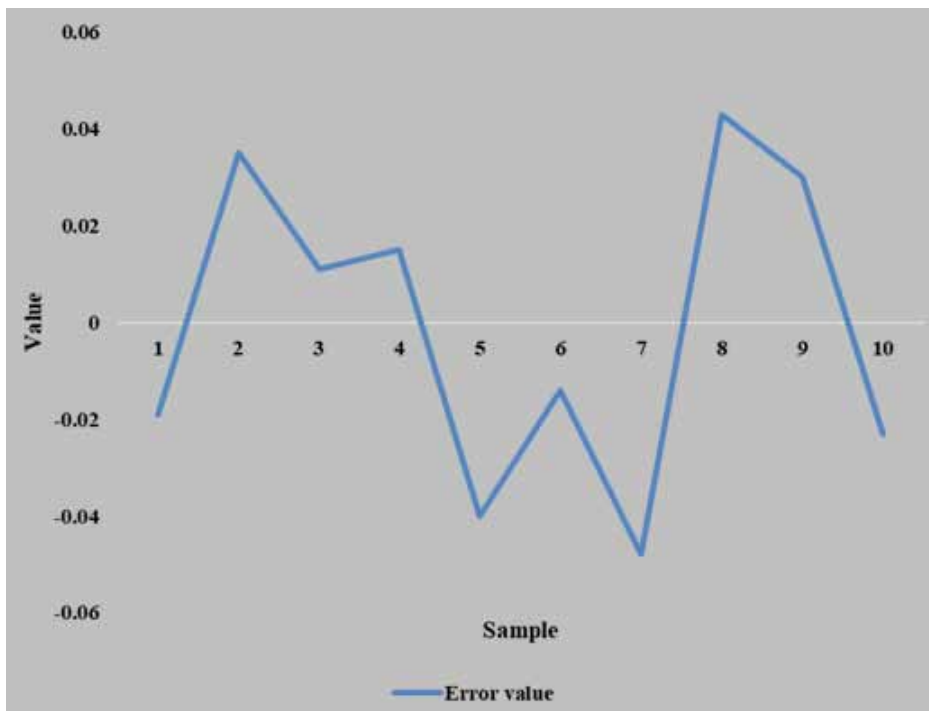
It can be seen from Table 3 and Figure 3 that the error value of the sample data after normalization is relatively small, which is within the range required by this article.

A system is available to be programmed after it has been configured for a specific purpose. The starting weights are selected from the population to begin this procedure. The education, or knowledge, the process then commences. There are 2 kinds of instructional strategies: supervised and unsupervised

Table 3. Error curve during testing

	Error value
1	-0.019
2	0.035
3	0.011
4	0.015
5	-0.04
6	-0.014
7	-0.048
8	0.043
9	0.03
10	-0.023

Figure 3. Error curve during testing



training. To verify the results of model evaluation, this article prepares 10 sets of experimental data and places them on a trained neural network. The results of the simulation are shown in Table 4 and the results of the expert evaluation are very close to those of the expert evaluation.

It can be concluded that the reporting error in Table 4 and Figure 4 is very close to the reporting error. Therefore, the quality of IAP education in college is a valid model and can be evaluated based on a deep neural network.

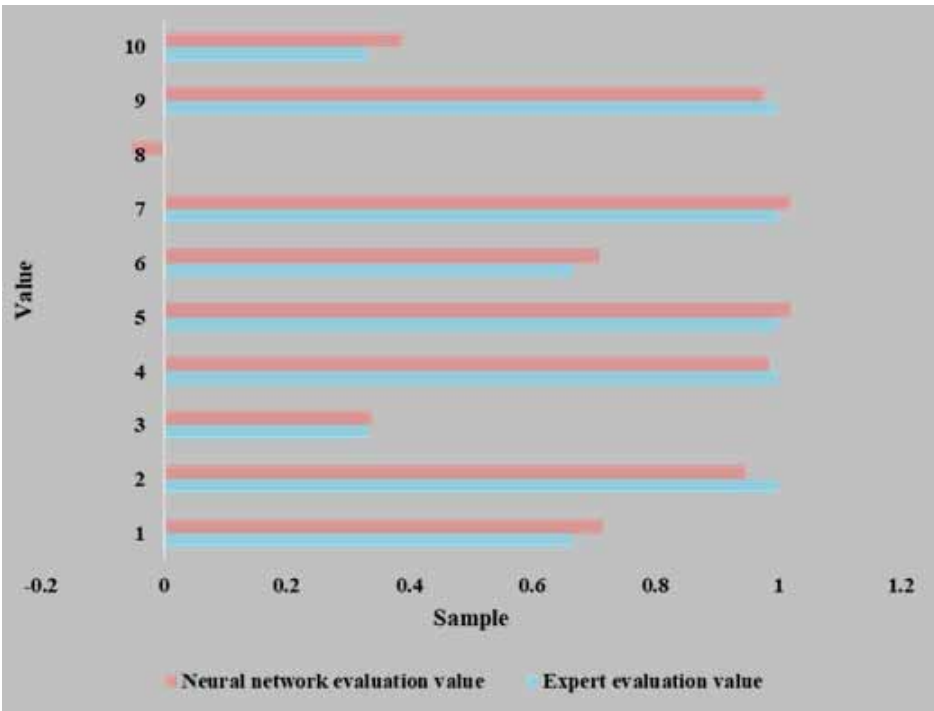
## CONCLUSION

Evaluating the teaching of education in the IAP in colleges is very important for the impact on TQ, the quality of the teaching staff and the learning of students. The quality assessment system of IAP education in colleges is a large nonlinear relationship. After studying some methods of pre-assessment of education and analyzing the advantages and disadvantages of the methods used, this paper deeply explores the logic, science and objectivity of assessment methods and provides assessment of teaching based on deep neural networks.

Table 4. Comparison table of expert evaluation results and neural network simulation evaluation results

Sample number	Expert evaluation value	Expert rating	Neural network evaluation value	Neural network evaluation results
1	0.6668	qualified	0.7133	good
2	1	excellent	0.9478	excellent
3	0.3334	Unqualified	0.3386	Unqualified
4	1	excellent	0.9855	excellent
5	1	excellent	1.0194	excellent
6	0.6668	qualified	0.7086	good
7	1	excellent	1.0201	excellent
8	0	Unqualified	-0.0522	Unqualified
9	1	excellent	0.9775	excellent
10	0.3334	Unqualified	0.3883	Unqualified

Figure 4. Comparison table of expert evaluation results and neural network simulation evaluation results



## FUND

- (1) HeBei Higher education teaching reform research and practice project (NO: 2020GJJG458): Research on influencing factors and improving strategies of young teachers' teaching ability in Application-oriented undergraduate colleges.
- (2) Cangzhou Jiaotong College Teaching research and reform project (NO: HB202002006): Research on influencing factors and improving strategies of young teachers' teaching ability in Application-oriented undergraduate colleges.
- (3) Hebei New liberal arts research and reform practice project (NO.2021GJXWK087): Optimization structure and practice of logistics with multi-level and multi-disciplinary integration under the perspective of new liberal arts.
- (4) Hebei Province higher institution Science and Technology Research Project (NO: ZC2022093): Research on the layout method of hub and spoke cold chain logistics network with three-level nodes

## REFERENCES

- Ahmad, A. R., & Alzorai, M. (2021). Towards the Sustainable Teaching Quality Through School Culture and Teachers' Commitment using PLS-SEM Approach. *Asia Proceedings of Social Sciences*, 8(2), 84–87. doi:10.31580/apss.v8i2.1894
- Cai, L. (2020). Japanese Teaching Quality Satisfaction Analysis with Improved Apriori Algorithms under Cloud Computing Platform. *Computer Systems Science and Engineering*, 35(3), 183–189. doi:10.32604/csse.2020.35.183
- Du, X. (2020). Application of deep learning and artificial intelligence algorithm in multimedia music teaching. *Journal of Intelligent & Fuzzy Systems*, 38(2), 1–11.
- Erdem, D., Beke, A., & Kumbasar, T. A. (2020). Deep Learning-Based Pipeline for Teaching Control Theory: Transforming Feedback Control Systems on Whiteboard into MATLAB. *IEEE Access: Practical Innovations, Open Solutions*, 8, 84631–84641. doi:10.1109/ACCESS.2020.2992614
- Feng, Y. (2020). An evaluation method of PE classroom teaching quality in colleges and universities based on grey system theory. *Journal of Intelligent & Fuzzy Systems*, 38(6), 1–12. doi:10.3233/JIFS-179769
- Fernández, M. J., Fernández, J. G., Aguilar, S. R., Selvi, B. S., & Crespo, R. G. (2013). Control of attendance applied in higher education through mobile NFC technologies. *Expert Systems with Applications*, 40(11), 4478–4489. doi:10.1016/j.eswa.2013.01.041
- Imran, M. (2019). Analysis of learning and teaching strategies in Surgery Module: A mixed methods study. *JPMA. The Journal of the Pakistan Medical Association*, 69(9), 1287–1292. PMID:31511713
- Li, W. (2021). Multimedia Teaching of College Musical Education Based on Deep Learning. *Mobile Information Systems*, 2021(2), 1–10. doi:10.1155/2021/5545470
- Lin, P. H., & Chen, S. Y. (2020). Design and evaluation of a deep learning recommendation based augmented reality system for teaching programming and computational thinking. *IEEE Access: Practical Innovations, Open Solutions*, 8, 45689–45699. doi:10.1109/ACCESS.2020.2977679
- Liu, P., Wang, X., & Teng, F. (2021). Online teaching quality evaluation based on multi-granularity probabilistic linguistic term sets. *Journal of Intelligent & Fuzzy Systems*, 40(2), 1–20. doi:10.3233/JIFS-202543
- Long, S., & Zhao, X. (2020). Smart teaching mode based on particle swarm image recognition and human-computer interaction deep learning. *Journal of Intelligent & Fuzzy Systems*, 39(4), 5699–5711. doi:10.3233/JIFS-189048
- Mbise, K. (2021). The Role of IT Professional Certifications in Instructors' Teaching Quality. *International Journal of Education and Development Using Information and Communication Technology*, 17(1), 176–187.
- Niet, Y. V., Diaz, V. G., & Montenegro, C. E. (2016). Academic decision-making model for higher education institutions using learning analytics. In *2016 4th International Symposium on Computational and Business Intelligence (ISCBI)*, (pp. 27-32). Olten, Switzerland.
- Nieto, Y., García-Díaz, V., Montenegro, C., & Crespo, R. G. (2018). Supporting academic decision making at higher educational institutions using machine learning-based algorithms. *Soft Computing*, 23(12), 4145–4153. doi:10.1007/s00500-018-3064-6
- Peng, F. (2020). Application of deep learning and cloud data platform in college teaching quality evaluation. *Journal of Intelligent & Fuzzy Systems*, 39(4), 5547–5558. doi:10.3233/JIFS-189036
- Tang, H., Ming, J. S., & Chen, Y. (2020). Application of PBL Can Improve the Teaching Quality of Professional Degree Graduate Students in Hepatobiliary Surgery. *Creative Education*, 11(12), 2609–2616. doi:10.4236/ce.2020.1112193
- Zhang, G. (2020). A study of Grammar Analysis in English Teaching With Deep Learning Algorithm. [iJET]. *International Journal of Emerging Technologies in Learning*, 15(18), 20. doi:10.3991/ijet.v15i18.15425
- Zureck, A. (2021). Achieving active learning and deep learning with media using the example of teaching finance. *Problems of Education in the 21st Century*, 79(3), 485-504.

*Hao Di was born in Cangzhou, Hebei Province, China, in 1983. He received undergraduate degree from Shanxi Normal University, and graduate degree from Nanjing normal University of Chinese Modern and Contemporary History. Now, he works in Cangzhou Jiaotong College. His research interests include Ideological and political education, Career Planning for college students.*

*Zhang Hui was born in Heze, Shandong Province, China, in 1984. He received undergraduate degree from Shandong Jiaotong University, and master's degree and doctor's degree from Beijing Jiaotong University. Now, he works in China Academy of Railway Sciences Co., Ltd. And research interests include logistics management and Railway Transportation.*

*Ping Li Cangzhou attends Jiaotong College.*