



Integrating Deep Learning into English Language Teaching Within the Digital Cultural Framework

Deng Yuhua^{1*} 

¹School of Foreign Languages, Shanghai Technical Institute of Electronics & Information, 201411, Shanghai, China

Deng Yuhua, dengyuhua@stiei.edu.cn

Abstract. English language teaching (ELT) assessment is an important part to improve the level of ELT and the management of ELT in schools. Instructional assessment can not only quantitatively assess teachers' teaching and students' learning effects in time, but also play an important guiding role in classroom teaching. Theoretically, Artificial neural network (ANN) can simulate any nonlinear continuous function within a certain precision range. Universities should attach great importance to the important role of instructional assessment in tertiary education and give full play to the role of instructional assessment. Based on the analysis of the present situation and characteristics of college instructional level assessment, this paper constructs an ELT assessment model for Digital Cultural with the help of deep learning (DL) technology, and then realizes the intelligence of ELT. The results show that compared with the traditional instructional assessment system, the assessment accuracy of this assessment algorithm is improved by 22.64%. Exploring the mathematical model between the input and output of the assessment system is of great value to the assessment of instructional level.

Keywords: English language teaching; Intelligent; Instructional assessment; Deep learning; Digital Cultural Framework

DOI: <https://doi.org/10.14733/cadaps.2024.S16.71-84>

1 INTRODUCTION

The emergence of IT has brought great changes to all aspects of people's lives, and at the same time, it has spawned new reforms in the field of education. In the final analysis, the fundamental reform is the mutual integration between IT and different disciplines [20]. The integration of IT and English is not only an instructional method, but also an instructional process. Its ultimate goal is to form a benign dynamic model of teacher-student interaction. Instructional assessment is the subjective judgment of the value of the research object based on facts, and different values will produce different assessment results [19]. In school work, teaching is the center of all work, and instructional

level management is the key to total quality management of the school. The instructional level is an important symbol to assess the success of a school [4]. Instructional assessment can provide reliable information and scientific basis for improving teaching and instructional level, and a scientific assessment system is an important guarantee for teaching success. Combining modern technology to improve the assessment process of ELT and constructing an intelligent assessment model of ELT is the realistic demand of realizing intelligent ELT. ELT assessment is an important part to improve the level of ELT and the management of ELT in schools. Instructional assessment is an important part of the instructional process. It can not only quantitatively assess teachers' teaching and students' learning effects in time, but also be an important guarantee for achieving educational goals and promoting students' development [21].

Instructional assessment is the subjective judgment of the value of the research object based on facts. Different values will produce different assessment results. Effective assessment of instructional level is an effective measure taken by schools to improve instructional level in an all-round way, effectively regulate teaching behavior, optimize the structure of teachers, promote the improvement of teachers' instructional level, and make the management of teachers systematic and scientific [11]. In the past, the assessment of ELT was mainly conceptual, lacking a unified standard, and there were different models with different viewpoints, different angles and different requirements. Therefore, the assessment of ELT level has always been a difficult problem that has not been well solved. As the instructional process includes teaching and learning, it is much more complicated to assess the instructional level than to assess the product quality, because the assessment system of instructional level often contains non-quantitative factors, which brings great difficulties to the assessment [16],[17]. Based on the analysis of the present situation and characteristics of college instructional level assessment, this paper constructs an ELT assessment model with the help of DL technology, and then realizes the intelligence of ELT.

In the past assessment system, the value of each assessment index was often calculated by simple mathematics, such as addition, subtraction, multiplication and division, to assess a teacher's instructional effect. However, this method has obvious shortcomings, because the relationship between the input and output of the assessment system is not necessarily a simple linear relationship. Instructional process includes teaching and learning. Evaluating the instructional level is much more complicated than evaluating the product quality. Teaching is a bilateral activity between teachers and students, while the instructional process is composed of many factors, and there are many factors that affect the instructional level. Therefore, there are more contents to be assessed [5],[12]. The knowledge of related situations can help learners think about what situations to apply the learned knowledge to achieve the set goals. Appropriate situations can overcome the abstraction of learning content, promote the maintenance of understanding and memory, and facilitate the strengthening and transfer of learning. In this paper, the mathematical model of ELT level assessment system is established by using neural network (NN) theory, which provides a reference for the research of ELT level assessment system. The main innovations of this research are as follows:

1. In this paper, the mathematical model of ELT level assessment system is established by using ANN theory, and the instructional level is assessed by training the network.
2. This paper discusses the main problems and difficulties in constructing a perfect ELT level assessment system, analyzes these problems and difficulties, and gives the solutions.
3. On the basis of dimension reduction, the network structure and learning algorithm of instructional level assessment model based on BPNN are determined, and the training results are analyzed.

The first section is the introduction, which introduces the development mode of intelligent ELT and puts forward the application of intelligent technology in ELT assessment. The second section is related work, which analyzes scholars' research on ELT and assessment, and puts forward the

research innovation of this paper. The third section is the method and model part, which puts forward the assessment method of ELT based on NN technology. The fourth section is the result analysis and discussion. The experimental results verify the effectiveness of NN assessment method in the construction of intelligent ELT mode, and discuss the intelligent development strategy of ELT. The fifth section is the conclusion, which summarizes the instructional assessment methods and their contributions, and puts forward the shortcomings and future development direction of this paper.

2 RELATED WORK

Humanistic theory emphasizes that assessment must be people-oriented, focusing on people's value, potential and self-realization. The developmental teacher assessment theory believes that teachers should realize the problems and their own shortcomings in the instructional process through the assessment and feedback control mechanism of different participants in the instructional process, so as to promote the improvement of teaching work and teachers themselves.

Akbari proposed to analyze the teaching behavior of teachers who are important participants in educational activities, and analyzed a quantity of useful and useless behaviors that have practical application value for quality assessment activities [1]. Pennington's research pointed out that when evaluating the level of university teaching, teachers can find out the problems existing in teaching through assessment, analyze the problems, and then solve the problems [14]. Li et al. designed and implemented an instructional level assessment model system, through which students can conduct online assessment activities for teachers and screen assessment indicators [9]. Sheridan believes that instructional level assessment is the foundation of teaching activities in universities, and the basic link to ensure the level of personnel training in universities [15]. Therefore, instructional level assessment is an important aspect of promoting quality education reform and improving instructional level, and a very important factor that affects the whole instructional level. Day puts forward how to improve the efficiency and accuracy of instructional assessment, and studies the instructional level assessment model. By processing the instructional level assessment indicators, the qualitative description is transformed into quantitative data, which facilitates the screening of follow-up assessment indicators and the establishment of instructional assessment models [6]. Huang et al. realized the application of instructional level assessment by establishing assessment index system, selecting index, setting index weight, and establishing instructional level assessment model with NN model [7],[18]. Aiming at the above-mentioned problems and deficiencies in instructional level assessment, Liu et al. found more reasonable index items through summarization and comparison, and obtained reasonable weight settings [10]. Özcan et al. conducted research on commonly used instructional assessment models. On the basis of the original assessment model, an instructional assessment model with improved efficiency and assessment accuracy was used [13].

This paper uses ANN theory to establish a mathematical model of the ELT level assessment system. After the training of the network, the instructional level can be graded, which provides a meaningful reference value for the research of the instructional level assessment system.

3 METHODOLOGY

3.1 Assessment of ELT Level

Instructional assessment is a continuous activity with multiple assessment factors and multiple levels. Because the assessment factors are usually qualitative and there is no general instructional assessment index system, generally different universities have their own index systems. Because of the different assessment factors and levels, different universities generally use different assessment

methods. Different universities may adopt one or several of these methods, but no matter which ones are adopted, student assessment is indispensable.

With the expansion of tertiary education in China, there are many kinds of assessments related to teaching activities. For those who are not studying pedagogy, it is difficult to clearly distinguish various assessments related to teaching activities with different names [3]. Classroom assessment is essential, but it is far from comprehensive in judging students' studies. Therefore, it is suggested that when evaluating students' academic performance, teachers should assess students' performance in English class, at the same time, they should make full use of multimedia network and other English-related classroom and extracurricular activities, know students' language mastery and application in time, and at the same time, understand their problems in the learning process, and judge the intellectual and non-intellectual factors that affect students' learning, so as to make them play a good role [22]. Teaching English through Digital Cultural can offer a more holistic and immersive language-learning experience that goes beyond just vocabulary and grammar, making it a powerful tool in language education.

Many universities use teachers, students and experts to evaluate teachers' classroom teaching, and this assessment method has some problems. For example, due to the many influencing factors and the complex assessment standards, some students and teachers will have a certain gap between the scores and the actual situation. There are many factors affecting ELT assessment, so it is necessary to select indicators from various aspects and ranges at the same time. The diversified assessment system must be student-centered, teacher-led, and advocate the cooperative relationship between testers and testees. In the assessment system, teachers are not only responsible for organizing and recording assessment activities, but also guiding and helping students in the assessment process. Through teachers' teaching, students get systematic knowledge, so as to promote the improvement of students' thinking ability. The assessment of teacher instructional level is an important part of university teaching management. Using a scientific and reasonable assessment method to conduct a fair assessment is crucial to mobilize the enthusiasm of teachers to do a good job in teaching, constantly improve the instructional level, and even the improvement of the instructional Level of the whole school.

3.2 Problems Existing in Instructional Level Assessment System

1. The assessment method is not objective

In the process of establishing the instructional level assessment system, many complicated factors will be involved, some of which can be grasped and some of which cannot be grasped. As far as student assessment is concerned, students, as individuals, have been involved in the whole instructional process of teachers. In the analysis system of learning behavior, it is necessary to give a simple and rigorous representation of learning behavior in order to achieve a unified description of learning behavior. Therefore, the data given by students are often convincing. However, there are also objective shortcomings in student assessment. Once students have problems with their attitudes towards teachers, the assessment results will inevitably be unfair and impersonal. The advantage of teaching management assessment is that it is familiar with instructional assessment indexes and assessment contents, and can be assessed accurately, and the assessment is comprehensive and reasonable. The deficiency of teaching management assessment lies in the fact that teaching managers can't always be in the front line of teaching, so the understanding of the instructional process is open to question, and the assessment results are often unfair. Expert assessment is a relatively reliable way to assess instructional level.

2. Incomplete assessment contents

Assessment is a measure of teaching. To measure a thing, we must grasp its attributes and characteristics. Instructional level assessment is the assessment of the classroom teaching effect

and related factors. It is not only an important part of instructional level management and instructional ability assessment, but also an important measure for schools to improve teaching work and improve instructional level. However, the current assessment methods for instructional assessment are always constant and changeable, thus losing the objectivity and scientificity of the assessment. Besides, other factors besides classroom teaching will also affect the instructional level, but they are not reflected in the indicators of the instructional level assessment system, which lacks comprehensiveness.

3.3 ELT Assessment Model Based on DL

ELT has its own particularity, for it to build a more scientific curriculum assessment system, is an effective method of course instructional level management. For schools, the instructional level directly affects the level of running a school. It can be said that the instructional level is the foundation of institutions of tertiary education, the lifeline of the survival and development of the school, and the starting point and foothold of all the work of the school. The BPNN method is to make a general assessment of things or objects restricted by multiple factors. It can not only eliminate the interference of extreme cases, improve the reliability and validity of the whole assessment, but also can simulate the psychological process of comprehensive assessment more realistically. Instructional level assessment can comprehensively assess teachers' ideological style, work ability, work attitude and work performance, objectively reflect teachers' instructional level, and provide a basis for reasonable selection of teachers. In instructional assessment, teachers or education authorities should participate, and more importantly, students who are assessed should also make a reasonable assessment of their own learning. In the process of teaching, teachers can effectively assess students' achievements at any time, such as in classroom discussions, students' homework and all aspects of classroom teaching, while taking into account students' extracurricular English learning [8]. In the process of ELT, teachers should, on the one hand, guide students to set their own goals, and use them as a standard to test their English learning results. On the other hand, students should learn self-reflection, self-improvement and self-improvement, and encourage them to actively participate in the learning process, so that the burden on teachers can be slightly reduced.

As a teacher, we should adjust our teaching according to different assessment situations, so as to improve the effect of classroom teaching and make the assessment truly serve the teaching. Since instructional assessment should judge students' learning on the one hand, it requires the evaluators to take the initiative to accept assessment and be able to assess their own learning. Teachers should guide students' self-assessment, understand students' learning process, and let students have their own development goals [2]. This section establishes an instructional level assessment model based on the classic learning and classification ability of BPNN, and trains the network with a large quantity of classified samples, so that the network system with analytical ability can objectively assess the instructional level. Under the network environment, the relative separation between teachers and students makes it impossible for teachers to communicate and interact with students face to face like traditional teaching, so it is impossible to know and understand students through traditional methods, but the understanding of students' situation directly affects the validity and reliability of assessment. In the teaching process, the computer software technology is used. An example is presented. The NN model is shown in Figure 1.

ELT has its own particularity, and it is an effective way to construct a more scientific curriculum assessment system for it. For schools, the instructional level directly affects the level of running schools. Instructional level assessment is the assessment of the classroom teaching effect and its related factors. It is not only an important part of instructional level management and instructional ability assessment, but also an important measure for the school to improve teaching work and improve instructional level.

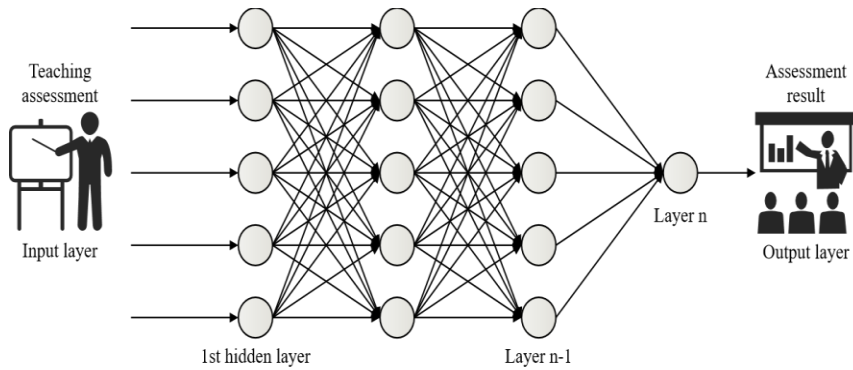


Figure 1: Multi-Layer NN model.

The BPNN improved by adaptive learning rate adjustment method is adopted:

$$\Delta X = lr \cdot \frac{\partial E}{\partial X} \quad (1)$$

$$\Delta X(k+1) = mc \cdot \Delta X(k) + lr \cdot mc \cdot \frac{\partial E}{\partial X} \quad (2)$$

Where lr is the learning rate and mc is the momentum factor. The added momentum term is essentially equivalent to the damping term, which reduces the oscillation tendency of the learning process, thereby improving the convergence and finding a better solution. Usually the criterion for adjusting the learning rate lr is to check whether the correction of the weights really reduces the error function. Using a scientific and reasonable assessment method to conduct a fair assessment is crucial to mobilize the enthusiasm of teachers to do well in teaching, constantly improve the instructional level, and even improve the instructional Level of the whole school.

Since the linear relationship between the input vector $X(x_1, x_2, \dots, x_n)$ and the output vector is not satisfied, the unipolar sigmoid function is chosen as the excitation function:

$$f(x) = 1 / (1 + e^{-x}) \quad (3)$$

Based on the research results of modern neuroscience, NN theory designs an information processing system with the style of human brain by simulating the way that human nervous system processes, memorizes and processes information. The NN can automatically learn from the previous experience from the provided data samples, and it doesn't need a tedious search and expression process, and can automatically approach the functions that best describe the laws of the sample data, no matter what form these functions have. In the process of designing a NN, the network has to undergo several different learning rate trainings. By observing the decline rate of the sum of the squares of errors after each steps training, we can judge whether the selected learning rate is appropriate. The establishment steps of ELTassessment model based on BPNN are shown in Figure 2.

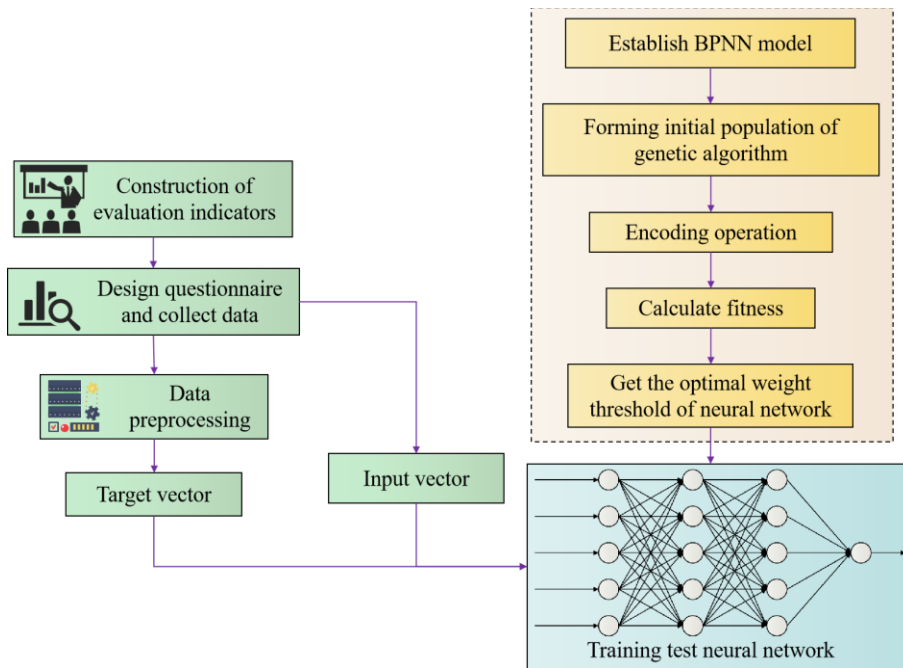


Figure 2: Establishment of ELT assessment model.

Weight adjustment formula with additional momentum factor:

$$\Delta W(t) = \eta \delta X + \alpha \Delta W(t-1) \quad (4)$$

Where W is the weight matrix, X is the input vector, α is the momentum coefficient, usually $\alpha \in (0,1)$.

The learning rate is:

$$\Delta w = -\eta \frac{\partial E}{\partial w} \quad (5)$$

If the learning rate is too high, the convergence rate can be improved. If the learning rate is small, the training can converge steadily, but the learning speed will be slow.

The error function is:

$$E = \frac{1}{2} \sum_{p=1}^p \sum_{k=1}^m (d_k^p - o_k^p)^2 \quad (6)$$

If the quantity of learning increases, then $|d_k^p - o_k^p|$ will become smaller and smaller, which may lead to slower function approximation.

$$E = \frac{1}{2} \sum_{p=1}^p \sum_{k=1}^m \ln [1 + (d_k^p - o_k^p)^2] \quad (7)$$

$$E = \frac{1}{2} \sum_{p=1}^p \sum_{k=1}^m (d_k^p - o_k^p)^2 + \frac{1}{2} \sum_{p=1}^p \left(\sum_{k=1}^m (d_k^p - o_k^p)^2 \cdot \sum_{j=1}^H (h_{rj} - 0.5)^2 \right) \quad (8)$$

$$E = \frac{1}{2} \sum_{p=1}^p \sum_{k=1}^m (d_k^p - o_k^p)^2 + p(w) \quad (9)$$

$$p(w) = \frac{\lambda}{n} \sum_{ij} |w_{ij}|^2 \quad (10)$$

The more complex and nonlinear the influencing factors are, the more obvious the advantage of NN is. This is because NN is self-adaptive, self-learning and self-organizing, and it is good at making decisions in an approximate, uncertain or even contradictory knowledge environment, and it can also avoid artificially determining index weights and calculating correlation coefficients.

4 RESULT ANALYSIS AND DISCUSSION

The ultimate goal of students' learning is to use their knowledge to solve practical problems. This level of behavior is called problem-solving behavior. After the bottom-level information consulting behavior and the top-level information assessment behavior and problem solving behavior are determined, the middle-level learning behavior is analyzed. Similar to the analysis of learning behavior, the highest level of online learning behavior is the learner's behavior of applying knowledge, such as homework submission. For college students, applying knowledge is often not the only purpose. Creating knowledge based on applying knowledge is the highest goal of learners. In view of the strong subjectivity of the importance of the influencing factors in the previous English classroom instructional level assessment model, and the assessment results cannot really reflect the shortcomings of teachers, this paper proposes an assessment method of English classroom instructional level based on the particle relationship matrix and BPNN. In order to better illustrate the superiority of BPNN, the comparison between BPNN and genetic algorithm shows the results in Table 1.

Method	Implicit neuron number	25	50	75	100
GA	Precision	0.11	0.45	0.95	1.28
	Time consuming	45.6	83.9	112.5	143.9
BPNN	Precision	0.15	0.62	1.34	1.88
	Time consuming	15.3	22.4	30.1	75.69

Table 1: Comparison of Algebraic Algorithms and BPNN.

It can be seen from the table that, for a given scale problem, BPNN can achieve higher calculation accuracy in a given calculation time, while the calculation accuracy of traditional genetic algorithm is much worse, and the calculation time is obviously higher.

The choice of network structure is very important in the whole network building process. A good network model structure can reduce the quantity of training, reduce workload and improve efficiency. Instructional level assessment system is a nonlinear mapping from input assessment index to output assessment result. Comparing the training results of instructional level assessment model based on BPNN and genetic algorithm, the results are shown in Table 2.

<i>Sample sequence number</i>	<i>BPNN</i>	<i>GA</i>	<i>Expectation value</i>
1	7.85	7.65	7.8
2	7.76	7.99	7.8
3	6.59	6.36	6.6
4	7.84	7.68	7.8
5	7.24	7.56	7.2
6	6.95	6.07	6.9

Table 2: Comparison of expected value and predicted value of algorithm training results.

According to system science, it is an effective method to understand and analyze complex systems by decomposing complex systems into hierarchical structures with dependency and inheritance in structure or function, and the hierarchical characteristics of complex systems are one of the important theoretical bases for building system models. In the process of learning, there are a large number of behaviors of mutual cooperation and communication. Through communication and cooperation, we can strengthen the understanding of knowledge and provide ideas and methods for problem solving. This level of behavior is called cooperative learning behavior. The fuzzy assessment method of instructional level can effectively deal with the qualitative indicators described in fuzzy language, and can avoid the disadvantages of the subjective randomness of the traditional methods to a large extent, which has a certain scientific and reasonable. As a deep learning algorithm, BPNN clarifies the conclusions with the support of strong data. ELT assessment using BPNN can consider various factors affecting instructional level comprehensively, and is not simply weighted average, avoiding the disadvantages of individual subjective assumption judged by others. The convergence of the initial group size training of ELTAssessmentNN is shown in Figure 3. The training error of initial group size is shown in Figure 4.

It can be seen that when the initial population size of ELTAssessmentNN is 30, the convergence time is the shortest and the error is the smallest. Therefore, the initial population size is 30. Once the structure of NN and its algorithm are determined, as long as new assessment index data are input, the instructional effect can be determined according to the output results of the model. Evaluating learners' learning environment, in order to investigate the current situation, characteristics and existing problems of learners' current environment, and its realistic and potential influences on learners, and transmit this information to teachers and administrators, so as to find solutions to keep the advantages and overcome the disadvantages in the environment.

Lack of application of modern scientific and technological methods and means, and imperfect assessment feedback and control mechanism are the important problems faced by the instructional level assessment system. Especially, the scientific establishment of assessment indexes and the rationality of index weight distribution will directly affect the correctness and credibility of assessment results. Different algorithms are applied to predict the assessment results in the sample data of ELT test, and then compared with the actual results. The comparison results are shown in Figure 5.

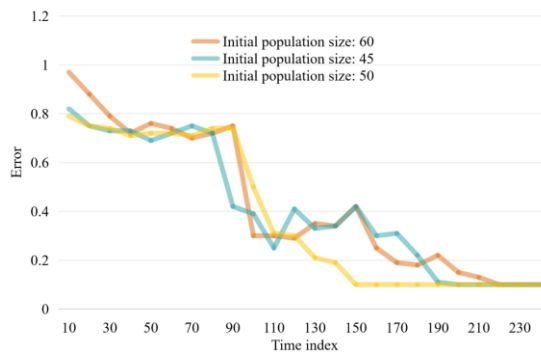


Figure 3: Convergence of initial group size training.

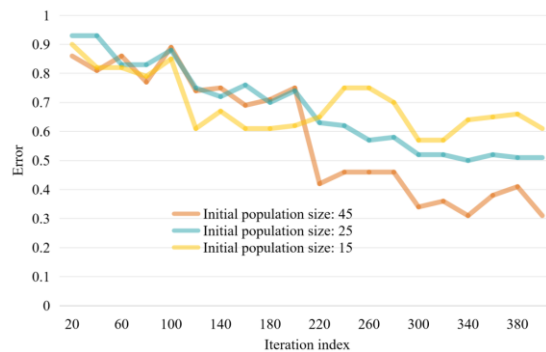


Figure 4: Training error of initial population size.

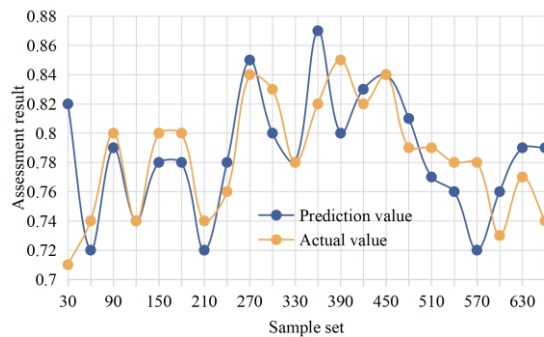


Figure 5: Comparison of predicted results with actual results.

These variables have a certain dependence on each other, that is, there is often a certain degree of correlation between them, sometimes even quite high correlation, which makes the information in the observed data overlap to some extent. This study uses the particle matrix and BPNN method to evaluate the quality of ELT, which makes the assessment results more comprehensive and reasonable, which is conducive to promoting the improvement of the instructional Level. The

assessment algorithm in this paper is compared with the algorithm in reference [16], and the result is shown in Figure 6.

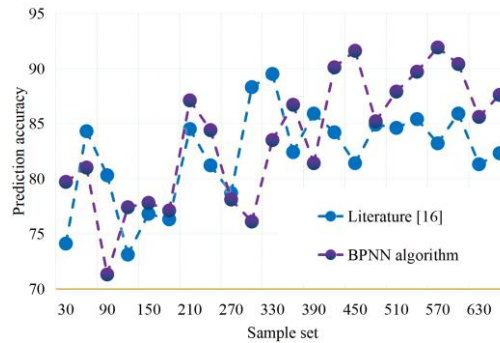


Figure 6: Comparison of assessment accuracy.

The results show that this method has higher prediction accuracy than the traditional instructional assessment model. According to the humanistic theory, it is believed that the development and change of learners is a process with rich connotations, and the level of learning results is not the only indicator of learners' development. Therefore, in the process of evaluating learners, we should not only lay emphasis on the summative assessment, but also lay emphasis on the formative assessment in the process, and combine the two. On the one hand, we should lay emphasis on the development and incentive function of formative assessment, on the other hand, we should also lay emphasis on the screening, screening and selection function of summative assessment.

The scatter diagram of predicted value and actual value using the instructional assessment model of reference [16] is shown in Figure 7. The scatter diagram of predicted value and actual value using BPNN instructional assessment model is shown in Figure 8. The dots on the graph indicate the ratio of the predicted value to the actual value.

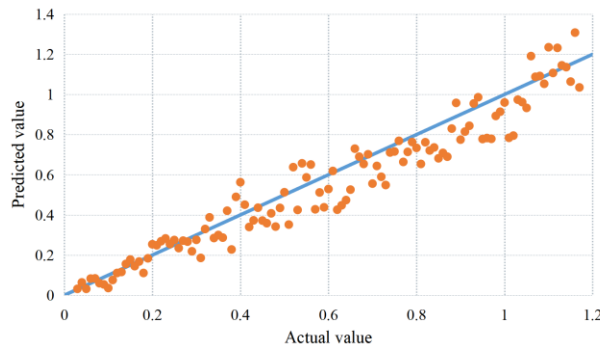


Figure 7: The scatter plot of the actual value and the predicted value of the method in reference [18].

It can be analyzed that the ELTassessment model based on BPNN is better than that in reference [18] in terms of time measurement accuracy and efficiency. Compared with the traditional instructional assessment system, the assessment accuracy of this assessment algorithm has increased by 22.64%.

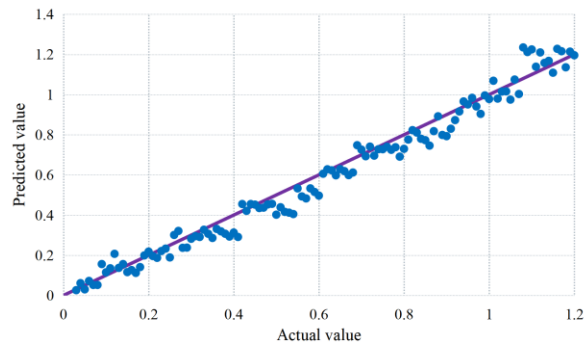


Figure 8: Scatter Plot of Actual and Predicted Values of BPNN.

Therefore, it is feasible to establish an intelligent ELT mode by using BPNN. Through the assessment results, teachers can understand the actual situation of students, find out the existing problems in teaching, reflect and improve their own instructional plans and instructional methods, and also provide some basis for personnel decision-making.

5 CONCLUSIONS

Due to the continuous progress of the scale of university education, the instructional level has become a significant problem. How to assess the level of university instructional effectively and objectively is one of the key issues studied by universities and educational institutions in recent years. Combining modern technology to improve the assessment process of ELT and constructing an intelligent assessment model of ELT is the realistic demand of realizing intelligent ELT. Instructional assessment can provide reliable information and scientific basis for improving teaching and instructional level, and a scientific assessment system is an important guarantee for teaching success. This paper discusses the main problems and difficulties in the construction of ELT level assessment system, and establishes the mathematical model of ELT level assessment system by using ANN theory to assess the instructional level. The results show that compared with the traditional instructional assessment system, the assessment accuracy of this assessment algorithm is improved by 22.64%. Therefore, it is feasible to establish an intelligent ELT mode by using BPNN. Through the assessment results, teachers can understand the actual situation of students, find out the existing problems in teaching, reflect and improve their own instructional plans and instructional methods, and also provide some basis for personnel decision-making.

This paper realizes the application of the ELT assessment model based on DL, but the assessment items of the teacher's instructional assessment model are given through questionnaire adjustment and discussion with teachers. Human factors are inevitable for such assessment indicators, but in the future, more efforts should be made to improve and establish a more reasonable index system.

ACKNOWLEDGEMENT

This work was supported by the 2020 Special topic of Ideological and Political Research on Foreign Language Teaching Courses in Vocational Colleges "A Study on Ideological and Political Teaching Mode of English Courses in Vocational Colleges from the Perspective of Multi-Modal Metaphor" (No. WYJZW-2020-2049), and 2016 Higher Vocational Teaching Research Association project "Flipped Classroom in the Middle and Higher vocational English Teaching Practice" (No. B-ZH-2016-006).

Deng Yuhua, <https://orcid.org/0009-0000-5708-8515>

REFERENCES

- [1] Akbari, R.; Behzadpoor, F.; Dadvand, B.: Development of English Language Teaching Reflection Inventory, System, 38(2), 2010, 211-227. <https://doi.org/10.1016/j.system.2010.03.003>
- [2] Application of Big Data, Blockchain, and Internet of Things for Education Informatization: First EAI International Conference, BigIoT-EDU 2021, Virtual Event, August 1–3, 2021, Proceedings, Part II, Springer Nature, 2021.
- [3] Chen, C. H.; Tzeng, G. H.: Creating the Aspired Intelligent Assessment Systems for Teaching Materials, Expert Systems with Applications, 38(10), 2011, 12168-12179. <https://doi.org/10.1016/j.eswa.2011.03.050>
- [4] Chen, Z.: Using Big Data Fuzzy K-Means Clustering and Information Fusion Algorithm in English Teaching Ability Evaluation, Complexity, 2021(5), 2021, 1-9. <https://doi.org/10.1155/2021/5554444>
- [5] Chur-Hansen, A.; Vernon-Roberts, J.: The Evaluation of Undergraduate Students' written English Language Skills, Medical Education, 34(8), 2010, 642-647. <https://doi.org/10.1046/j.1365-2923.2000.00539.x>
- [6] Day, R. R.: Extensive Reading in English Language Teaching, ELT Journal, 2011(1), 2011, 99-101. <https://doi.org/10.1093/elt/ccq076>
- [7] Huang, W.: Simulation of English Teaching Quality Evaluation Model Based on Gaussian Process Machine Learning, Journal of Intelligent and Fuzzy Systems, 40(2), 2021, 2373-2383. <https://doi.org/10.3233/JIFS-189233>
- [8] Kayama, M.; Okamoto, T.: Towards Intelligent Media-Oriented E-Learning Environments, Life Sciences, 14(1), 2015, 187-198.
- [9] Li, X.: Characteristics and Rules of College English Education Based on Cognitive Process Simulation, Cognitive Systems Research, 57(10), 2019, 11-19. <https://doi.org/10.1016/j.cogsys.2018.09.014>
- [10] Liu, L.: Research on IT English Flipped Classroom Teaching Model Based on SPOC, Scientific Programming, 2021(5), 2021, 1-9. <https://doi.org/10.1155/2021/7273981>
- [11] Lu, C.; He, B.; Zhang, R.: Evaluation of English Interpretation Teaching Quality Based on GA optimized RBF NN, Journal of Intelligent and Fuzzy Systems, 40(2), 2021, 3185-3192. <https://doi.org/10.3233/JIFS-189357>
- [12] Mason, D.: Doing Action Research in English Language Teaching. A Guide for Practitioners, System, 38(3), 2010, 506-507. <https://doi.org/10.1016/j.system.2010.06.005>
- [13] Özcan, Özyurt.; Özyurt, H.; Baki, A.: Design and Development of an Innovative Individualized Adaptive and Intelligent E-Learning System for Teaching–Learning of Probability Unit: Details of UZWEBMAT, Expert Systems with Applications, 40(8), 2013, 2914-2940. <https://doi.org/10.1016/j.eswa.2012.12.008>
- [14] Pennington, M. C.; Hoekje, B. J.: Framing English language teaching, System, 46(15), 2014, 163-175. <https://doi.org/10.1016/j.system.2014.08.005>
- [15] Sheridan, Cheryl L.: National Journals and Centering Institutions: A Historiography of an English Language Teaching Journal in Taiwan, English for Specific Purposes, 38(10), 2015, 70-84. <https://doi.org/10.1016/j.esp.2014.12.001>
- [16] Soureshjani, K. H.: Book Review: Doing Action Research in English Language Teaching: A guide for practitioners, Journal of Mixed Methods Research, 9(2), 2014, 196-197. <https://doi.org/10.1177/1558689814529474>
- [17] Vásquez, C.; Aslan, E.: Pragmatics and Prosody in English Language Teaching, Journal of Pragmatics, 44(12), 2012, 1716-1719. <https://doi.org/10.1016/j.pragma.2012.07.006>
- [18] Villanueva, K. A.; Brown, S. A.; Pitterson, N. P.: et al. Teaching evaluation practices in engineering programs: Current approaches and usefulness, International Journal of Engineering Education, 33(4), 2017, 1317-1334.

- [19] Wyse, D.; Sugrue, C.; Fentiman, A.: et al. English Language Teaching and Whole School professional development in Tanzania, *International Journal of Educational Development*, 38(5), 2014, 59-68. <https://doi.org/10.1016/j.ijedudev.2014.04.002>
- [20] Yang, L.: Fuzzy Cluster Correlation Mapping for Online Evaluation of Teaching Efficacy Towards IoT study, *Cognitive Systems Research*, 52(12), 2018, 365-370. <https://doi.org/10.1016/j.cogsys.2018.07.025>
- [21] Yu, H.: Online Teaching Quality Evaluation Based on Emotion Recognition and Improved Aprioritid Algorithm, *Journal of Intelligent and Fuzzy Systems*, 40(5), 2020, 1-11. <https://doi.org/10.3233/JIFS-189534>
- [22] Zhang, Y.: Interactive Intelligent Teaching and Automatic Composition Scoring System Based on Linear Regression Machine Learning Algorithm, *Journal of Intelligent and Fuzzy Systems*, 40(2), 2021, 2069-2081. <https://doi.org/10.3233/JIFS-189208>