Exploring the Effectiveness of Social Media for Collaborative Learning in the Digital Transformation of English Education

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Abstract With the increasing development of information technology in China, the application value of social media has been further highlighted. Compared with traditional media, the interactivity of social media is more in line with the requirements of students' academic communication, which is conducive to students' discussion of their own views and enhancement of their learning effect. This paper proposes the realization path of social media in the construction of the English classroom, through the network teaching, interactive teaching and other methods, to carry out the research on the transformation of English education to digitalization. Using two-branch network DNN-CBLM, a classification prediction model of English performance is constructed based on students' online learning behavior. BP neural network was introduced to establish the factors influencing the quality of English teaching and to realize the effective evaluation of English teaching quality based on the objective attributes of English teaching quality evaluation.91.348% of the students were satisfied with the use of social media for their English learning, and compared with the traditional media teaching class, the English performance of the experimental class of social media teaching was improved by more than 5 points, and the mean value was 6.337% higher than that of the control class. Further analyzed using the independent sample t-test, the sig value of the mean equation of the two groups of experimental subjects is 0.004, which is lower than 0.05, indicating that the students in the experimental class have a higher understanding of the knowledge points and a better learning effect under the social media-based teaching environment.

Index Terms two-branch network DNN-CBLM, BP neural network, social media, teaching quality evaluation

I. Introduction

In recent years, China's university education reform has continued to increase, constantly promoting the deep integration of information technology and higher education in order to innovate the talent cultivation mode, which puts forward new requirements for English teaching in colleges and universities [1], [2]. As a mode of communication and sharing, social media has become more and more prominent in the field of education. Compared with traditional media, social media interaction mode presents multidirectional characteristics, which is more in line with the requirements of students' learning and communication, and is conducive to students' sharing of their own views, completing the creation of thematic views, and communicating and exchanging ideas with each other [3]-[5]. Especially in the application of foreign language teaching, not only helps to realize the science of foreign language teaching, active classroom atmosphere, but also can increase students' learning interest and mobilize students' participation [6], [7]. In addition, network users fully utilize social media to obtain English learning materials, freely choose reading and discussion topics, and form communication communities according to their own cognitive preferences, thus realizing multiple interactions of knowledge and information [8]-[10].

Under the social media teaching environment, English collaborative learning emphasizes more on students' active exploration and discovery, which fully embodies students' subjectivity and value [11]. Its integration with social media as a trend of teaching practice makes collaborative learning no longer a formality, and can improve students' critical thinking ability and innovation ability, so that students can achieve better learning results [12]-[14]. Therefore, the constructed social media collaborative learning model has better operability and replicability, which can make more students benefit from the social media-based collaborative learning model.

This paper integrates digital technology and English education to improve the teaching effectiveness of English education classroom based on three basic principles of English interactive classroom construction under social media. It proposes a classification prediction model of English performance based on two-branch network DNN-CBLM, which realizes the effective prediction of students' English performance through their behavioral characteristics in English social media online courses. At the same time, the factors affecting the quality of English teaching are analyzed to make an objective evaluation of English teaching quality in a more comprehensive and

integrated way. Combining the analysis results of different evaluation indexes in the composition of factors influencing the quality of English teaching, the BP neural network model is introduced, and according to the objective attributes of the evaluation of the quality of English teaching, it effectively evaluates the quality of English teaching and guarantees the reliability of the evaluation results to the greatest extent possible. Through simulation experiments and empirical investigations, the use value of the constructed model is verified, and the actual learning effect of English teaching mode under social media is evaluated.

II. Social media-based English interactive classroom construction

II. A. Carrying out online teaching and building an efficient classroom

II. A. 1) Actively changing teaching concepts to grasp students' social interactions

In the Internet era, college students are increasingly active in social media, they rely on online social media to share their daily study life and utilize online channels to carry out diversified interactions. In this context, English teachers should keep abreast of the changes of the times, change their teaching concepts, carry out interactive online teaching of college English, and enhance the overall interactive teaching effect. In addition, the teaching and research group should develop English interactive teaching micro-courses on social media platforms, so that students can watch English videos, audio and pictures on mobile phones in a fragmented time, deeply understand the English content they have learned, and continue to improve their comprehensive English literacy.

II. A. 2) Grasp the Characteristics of Social Media Platforms and Continuously Optimize English Teaching Content

Teachers should fully grasp the characteristics of the social media platform, formulate targeted teaching programs based on the characteristics of students, adjust the goal of English ability training in a timely manner, improve their own technical application skills, integrate all aspects of the English teaching resources on the media platform, regularly push the relevant teaching content, strengthen the differentiation and relevance of the content of the English teaching, carefully select network materials, combined with the objectives of English teaching to produce professional interactive We carefully select online materials and make professional interactive English courseware with English teaching objectives. Through the intervention of micro-video and audio, we can fully enhance the fun and infectious power of English teaching. In order to further enhance the teaching effect, English teachers can introduce hot social events into the teaching resource system, so that classroom learning can be more in line with the social reality, enhance the activity and interactivity of the classroom, and improve the students' sense of experience during the whole process of English learning.

II. A. 3) Carrying out specialized English online teaching to improve students' English application ability

Teachers can divide the teaching content into writing, reading, listening and other modules, combine with the students' characteristics, scientifically set special English learning goals, and enhance the students' motivation to learn English. At the same time, the use of microblogging, WeChat and other diversified social media platforms to widely disseminate information on English teaching, motivate students to adhere to online learning, and continue to strengthen their own English specialization.

II. A. 4) Fully integrate all kinds of network resources and continuously enrich the content of English teaching.

Teachers should integrate network resources to make up for the shortage of traditional English teaching resources. At the same time, colleges and universities should carry out regular training activities for English teachers to continuously improve their information literacy and technical skills, so that English teachers can rely on social media to carry out online teaching, remotely guide students to participate in the course of study, and allow students to complete the internalization of the knowledge they have learned in the process of participation.

II. B. Fostering student habits and engaging students

II. B. 1) Adhering to the people-centered approach, creating an experiential classroom

Teachers should use new media technology to continuously optimize the teaching mode and enhance students' learning experience. In teaching practice, they should pay attention to mining the interactive elements of social media to create a sense of immersion and participation in the English learning atmosphere for students, so as to stimulate the active participation of students. In the traditional concept, social media mostly exists as a network entertainment carrier. However, under the vision of teaching reform, we should pay attention to discovering the connection point between social media and English interactive classroom, on the basis of which we present English learning content with the help of media tools to create an interactive learning environment for students. In the Internet era, teachers should actively mobilize students' subjectivity and encourage them to participate in social media English interaction, so as to realize the close connection between the class and the class, the network and the reality, and to promote the improvement of students' English literacy in different learning scenarios. After class,

teachers can use teaching tools to issue English questionnaires to understand the specific situation of students' participation in English learning using social media, on the basis of which they can refine the interactive teaching program of college English based on social media to ensure the accurate implementation of teaching strategies.

II. B. 2)   Expanding media channels and conducting multiple evaluations

Teachers should pay attention to the application of catechism and microclasses to carry out high-quality course evaluation, and at the same time encourage students to participate in teaching evaluation to lay a foundation for teachers' teaching reflection. The construction of English interactive classroom is conducive to prompting students to change their thinking and carry out offline English learning independently, which really forms a virtuous cycle of online and offline teaching.

II. C.Integration of educational methods to improve interactive effects

In the process of creating an interactive English classroom based on social media, English teachers should flexibly integrate educational methods and realize the effective linkage between online and offline, so as to ensure the teaching effect of the interactive English classroom. For example, creating a flipped classroom, regularly uploading high-quality English teaching content, amplifying the convenience and effectiveness of social media teaching, so that students can complete pre-class previews, independently find out the content of the course content doubts, and efficiently carry out the course content learning. In the process of using social media to carry out English teaching, teachers should ensure the effective connection between media resources and textbook content, guide students to sort out the knowledge network, effectively mobilize the classroom learning atmosphere, and enhance the enthusiasm of students to participate in English interaction.

III. Modeling of assessment of teaching effectiveness

III. A. Creating a Performance Prediction Model for Interactive English Courses Based on Social Media

III. A. 1)   DNN-CBLM Achievement Classification Prediction Model

This chapter proposes a two-branch network DNN-CBLM-based English grade classification prediction model, whose goal is to effectively predict whether a student can successfully pass an English course through the temporal features of his/her clicking behaviors and the background features in an online course [15].

Specifically, the DNN-CBLM grade classification prediction model is divided into two modules: the CBLM-based network module for extracting temporal features of students' clicking behaviors and the DNN-based network module for extracting students' background features, which extracts different types of features, and ultimately splices the two types of feature vectors to form a two-branch network model.
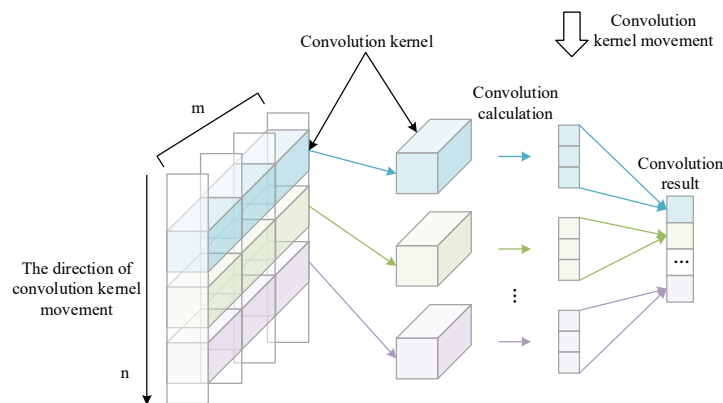

Figure 1: Convolution process of the ID-CNN convolution kernel

III. A. 2)   CBLM-based temporal feature extraction network for student clicking behavior

The multi-scale CNN layer comprehensively extracts the local information in the temporal features of student clicking behaviors by using different sizes of convolution kernels to cover multiple temporal spans [16]. Considering the characteristics of the time-series features of students' clicking behaviors, this study uses one-dimensional convolution (1D-CNN) for the convolution operation. In terms of the convolutional layers, small-scale convolutional kernels help to preserve the original input data, but the perceptual field of view is limited: whereas, large-scale convolutional kernels have wider perceptual field of view but tend to lead to the problem of over-smoothing. In this

study, three different convolutional kernels are utilized for 1D convolution, and then multi-scale feature fusion is achieved by serial superposition and parallel splicing to output comprehensive features. The convolution process of a single 1D-CNN convolution kernel is shown in Fig. 1, where the size of the convolution kernel is 1, n denotes the time length of the clicking behavioral temporal features, and m denotes the number of feature channels. The output of this convolutional approach still maintains the temporal order.

In this study, convolution kernels of sizes 3, 5, and 7 are used to perform multiscale convolution operations, and the computational process is described in detail as shown below:

$$K_1 = T \tag{1}$$

$$K_2 = C_3(K_1) \tag{2}$$

$$K_3 = C_5(K_2) \tag{3}$$

$$K_4 = C_7(K_3) \tag{4}$$

$$X = Concatenate(K_1, K_2, K_3, K_4) \tag{5}$$

In the above equation T denotes the click behavior temporal feature input, C_i denotes the one-dimensional convolution operation with convolution kernel size i, where $i \in \{3, 5, 7\}$. $Concatenate$ denotes the vector splicing operation, and X denotes the output of the final multiscale CNN layer, X can be specifically represented as vectors $[x_1, x_2, x_3, \ldots, x_t]$.

The student clicking behavior features are outputted as $[x_1, x_2, x_3, \ldots, x_t]$ as inputs to the Bi-LSTM layer after passing through the multi-scale CNN layer [17]. Bi-LSTM is composed of two directional LSTMs, and compared to unidirectional LSTMs, Bi-LSTMs is able to process forward and backward temporal information of the data. And the LSTM is composed of various memory units, including forgetting gates, input gates, and output gates, which are gating mechanisms that enable the LSTM to efficiently capture temporal information in the sequence of students' clicking behaviors. For the inputs $[x_1, x_2, x_3, \ldots, x_t]$ of the Bi-LSTM layer, the computational procedure is shown below:

$$f_t = \sigma(W_f * [h_{t-1}, x_t] + b_f) \tag{6}$$

$$i_t = \sigma(W_i * [h_{t-1}, x_t] + b_i) \tag{7}$$

$$\tilde{c}_t = (W_x * [h_{t-1}, x_t] + b_c) \tag{8}$$

$$c_t = f_t \otimes c_{t-1} + i_t \otimes \tilde{c}_t \tag{9}$$

$$o_t = \sigma(W_o * [h_{t-1}, x_t] + b_o) \tag{10}$$

$$h_t = o_t \otimes \tan hc_t \tag{11}$$

In the above equation $[x_1, x_2, x_3, \ldots, x_t]$ are the inputs of the LSTM units, f_t, i_t, o_t are the states of the forgetting gate, the input gate, and the output gate in the t - moment, respectively. And where h_{t-1} is the hidden layer output at the moment of $t-1$, c_{t-1} is the output state of the memory cell at the moment of $t-1$. W_f, W_i, W_x, W_o are the weight matrices of the forgetting gate, the input gate, the cell state, and the output gate. b_f, b_i, b_c, b_o are the bias terms. h_t is the output value of the memory cell. σ is the sigmoid activation function. tanh is the hyperbolic tangent activation function. $\otimes$ is the Hadamard multiplication.

Bi-LSTM has a higher capability of modeling temporal data than LSTM. The output of Bi-LSTM is jointly determined by the outputs of LSTMs in different directions. The forward LSTM is combined with the backward LSTM and the computational procedure is shown below:

$$h_t^R = f^R(W_1 x_t + W_2 h_{t-1}^R) \tag{12}$$

$$h_t^L = f^L(W_3 x_t + W_5 h_{t+1}^R) \tag{13}$$

$$h_t = f(W_4 h_t^R + W_6 h_t^L) \tag{14}$$

In the above equation h_t^R, h_t^L are the outputs of forward-propagating LSTM and backward-propagating LSTM at the moment of t, and W_1 to W_6 are the weight parameters. f^R, f^L are the activation functions for the forward propagation LSTM layer and the backward propagation LSTM layer, respectively, and f is the activation function for the final result splicing.

The input data $[x_1, x_2, x_3, \ldots, x_t]$ are subjected to temporal feature extraction by the Bi-LSTM layer, and the final output is $[h_1, h_2, h_3, \ldots, h_t]$.

III. B. *English Teaching Quality Evaluation Model*
III. B. 1) 3.2.1 Analysis of factors affecting the quality of teaching and learning

In order to be able to make a more comprehensive and comprehensive objective evaluation of the quality of English teaching, this paper analyzes the factors affecting the quality of teaching. Whether the teaching program is clear and specific, and whether it can provide clear guidance for teaching. Whether it is adapted to the learning needs of students and the requirements of the curriculum, and adjusted according to the actual situation. Whether all necessary contents and sessions are covered. Whether the teacher adopts a variety of teaching methods and is able to achieve the expected teaching effect, and whether he/she is able to utilize modern technological means for teaching. Whether the teacher emphasizes teacher-student interaction and encourages students to ask questions and discuss during the teaching process. Whether the teacher is able to organize classroom teaching effectively, manage classroom discipline, and adjust teaching strategies in time according to students' learning situation and feedback. Whether the teacher emphasizes the practicality and accuracy of the teaching content. Whether the teaching effect achieves the expected goals and has a positive impact on students.

III. B. 2)   English Teaching Quality Evaluation Based on Improved BP Neural Networks

Combining the results of the analysis of different evaluation indexes in the composition of factors influencing the quality of English teaching, this paper recognizes that different factors have different weights in the evaluation of teaching quality. Therefore, in the specific calculation process, this paper introduces the BP neural network and adapts it according to the objective attributes of English teaching quality evaluation [18].

First, let the English teaching quality evaluation index be X, then X can be expressed as:

$$X = \{X_1, X_2, X_3, X_4, X_5, X_6\} \tag{15}$$

where $X_1 \sim X_6$ denotes the teaching program, teaching means, teaching process, teaching attitude, teaching content and teaching effect of English teaching, respectively. For any X_n, its specific quantitative result can be expressed as:

$$X_n = \sum w_{in} x_{in} \tag{16}$$

where w_{in} denotes the weight parameter corresponding to the x_{in} influence factors in the X_n English teaching quality evaluation index.

On this basis, when the improved BP neural network is utilized to evaluate the quality of English teaching, the specific influencing factors are taken as inputs, while the calculation formula of the implicit layer is expressed as:

$$f(X_n) = \sum (w_{in} x_{in} - \lambda_{in}) \rightarrow f(net_{in}) \tag{17}$$

where $f(X_n)$ denotes the state of the English teaching quality evaluation index X_n, λ_{in} denotes the residuals of the network weights, and net_{in} denotes the minimum gradient error of the BP neural network [19]. The main function of Eq. (17) is to perform optimization of w_{in} to determine the degree of influence of different influencing factors in the corresponding English teaching quality evaluation index.

In this way, the output $f(X_n)$ is used as the input of the improved BP neural network, and similarly, the implicit layer can be utilized to calculate the results of the English teaching quality evaluation. The specific calculation formula is expressed as:

$$f(X) = \sum (W_n X_{in} - \lambda_n) \rightarrow f(net_n) \tag{18}$$

where $f(X)$ denotes the evaluation result of English teaching quality, and W_n denotes the weight of the English teaching quality evaluation index X_n, which parameter is calculated from the output of equation (17). According to the way shown above, the effective evaluation of English teaching quality is realized, and the reliability of the evaluation results is guaranteed to the maximum extent.

III. C. *Analysis of the Effectiveness of English Teaching*
III. C. 1)   Predictive analysis of student course performance

The DNN model predicts students' exam scores based on their historical answer scores, which is consistent with what happens when predicting manually, and although it can control the prediction deviation from being too large, the prediction is still rough. The DNN-CBLM score prediction model in this study combines the advantages of temporal features and background features, models students' knowledge state after acquiring students' question-answering data, considers the influence of students' learning efficiency and the relationship between knowledge points on students' knowledge state, and achieves more accurate by modeling students' mastery of knowledge points, the relationship between the score of the type of question to which the knowledge point belongs and students' scores, and achieves more accurate Prediction results.

A scatter-error diagram is plotted as shown in Fig. 2 for the performance prediction model DNN-CBLM to predict the performance of 1000 students and their real performance in the English four and six level exams. The pink orbs

are the predicted grades output by the model and the blue orbs are the students' real grades. The full score of English four and six exams is 710 points, the average score of the model's predicted grades is 472.456 points, the average score of the real grades is 469.526 points, and the error of the two is 2.93 points, the model's slightly higher predicted grades may be related to the students who play poorly in the examination room. For the MAE between the predicted score and the true score is 6.154 and the RMSE is 5.836.

Overall, the predicted grades obtained by this model are very close to the students' real exam grades, which shows that the grade prediction model of this study can predict students' grades more accurately according to their answer data, and help students to have an estimated value of their exam grades before the exam, which is of high application value.
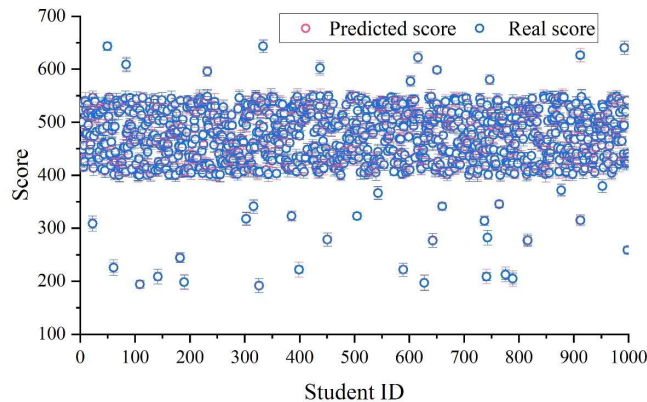

Figure 2: Achievement prediction model and student real achievement

III. C. 2) Evaluation of the quality of teaching and learning

(1) Data Collection

The size of the dataset to be collected in this project is the online course interaction information (learning status information) of about 1,000 students in English major courses for 2 academic years. The results in the BP neural network model are used as the predicted value of online teaching quality evaluation. The fusion scores of students' evaluation of teaching and college's comprehensive assessment are taken as the real values in the BP neural network model.

(2) Data preprocessing

Typically, preprocessing social media-based English online teaching data can be students' learning behavior data, teachers' teaching data, and so on. These data need to be transformed into numbers that can be recognized by the model so that the model can process them. Therefore, when expressing online teaching data, each type of data needs to be processed separately in order to be represented in the input layer. For example, for student learning behavior data, numbers such as 0/1 can be utilized to represent it.

(3) Model Training

1) Parameter setting. The indicators X1, X2, X3, X4...X9, X10 in Table 1 are used as 10 input layer data, X11 is the predicted value of the course name (X10) based on the BP neural network model from the first 10 indicators as the output layer, and the evaluation score Y is used as the real value of the output layer. The number of nodes in the input layer and the output layer are 10 and 1. The number of hidden layers is 5, and the number of neurons in each layer is equal to 10, which gives the best training results. After repeated tests and comparative analysis, it was found that the best training results were obtained when the number of iterations was 1000. At the same time, the learning rate is set to 0.05 and the training set share is 0.7.

2) BP algorithm realization. The student evaluation index system uses SPSS software to carry out simulation experiments, normalize the data of each index, and get the prediction results of the test number, as shown in Table 1, the mean value of the prediction results of 13 students is 88.653, and the difference between the real evaluation and the prediction results is about 0.576.

(4) Analysis of results

The model is analyzed and compared based on MSE, RMSE, MAE, MAPE, and R^2 metrics and the output is shown in Figure 3. Where the predicted value is compared with the case where only the mean value is used indicates the value of R^2, the closer the result is to 1 the more accurate the model is. The value of R^2 for BP neural network in teaching assessment is 0.952, which indicates that the model has a definite reference value.

Table 1: Prediction results of student evaluation test data

Student ID	Predictive result	Assessment score	Gender	Age	Absenteeism	Video learning frequency
	X11	Y	X1	X2	X3	X4
1	88.489	88	2	25	4	40
2	87.518	88	1	20	7	100
3	95.198	95	1	21	8	40
4	91.068	91	1	22	0	30
5	95.498	96	1	23	4	50
6	85.315	84	2	25	6	89
7	89.025	90	1	24	5	54
8	81.516	80	1	16	0	70
9	90.935	90	1	18	9	5
10	84.385	83	2	17	2	40
11	90.642	90	1	20	5	20
12	85.248	84	1	19	4	98
13	87.648	88	2	25	3	99

| Student ID	Class interaction	Job completion rate (%)	Participate in group discussion times	Check the number of new announcements	School year	Course name
	X5	X6	X7	X8	X9	X10
1	19	40	45	32	2	English education
2	17	90	64	20	2	English education
3	80	40	48	13	2	English education
4	3	35	30	40	2	English education
5	98	43	13	25	2	English education
6	20	90	68	5	2	English education
7	75	60	20	20	2	English education
8	90	98	20	3	2	English education
9	80	30	78	35	2	English education
10	10	34	45	50	2	English education
11	85	36	53	18	4	English education
12	25	80	50	18	4	English education
13	83	80	55	18	2	English education
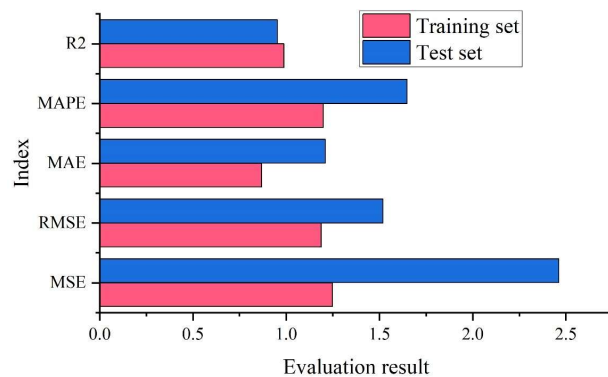
Figure 3: The effect of the BP neural network online teaching quality evaluation model

III. D. Evaluation of the effectiveness of English language teaching

III. D. 1) Acceptance and Satisfaction

Table 2 shows the acceptance and satisfaction of the social media-based English teaching model, performance expectations more than 80% of the students are agreeing with the model of teaching, that the model is helpful for inquiry-based teaching, quick mastery of learning content, and can improve learning efficiency, payoff expectations: 88.202% of the students agree that the operation of the model is easy, 85.289% of the students agree that the model makes learning interesting, attitude towards using it: 91.348% of the students said that they liked using the mode in their studies, behavioral intention: more than 88% of the students expect to use the mode in their future classes, and believe that the mode can be extended to other subjects and that there is a need for more teaching and learning in this mode. It can be seen that more than 80% of the students in the class have a positive attitude towards the interactive teaching and learning carried out in the English classroom in colleges and universities in the social media environment.

According to the results of the whole questionnaire survey, 2.945% of the students strongly dislike the interactive teaching mode in the social media environment and will not actively think and answer the questions in the teaching of this mode, 2.945% of the students think that the interactive teaching in the social media environment can't increase the interest in learning at all, and they think that this mode is not helpful for learning, and 5.89% of the students don't agree that this model can be extended to teaching other subjects. It can be seen that there are so 1 or 2 students in the class who are not very receptive to the teaching mode, and further interviews are needed to understand the actual thoughts of the students.

Table 2: Based on the social media's English teaching mode acceptance and satisfaction

Dimension	Topic	Very agree	Consent	Not necessarily	Different meaning	Very different
Performance expectation	Social media models help English teaching	58.845	23.548	17.607	0	0
	It is helpful to learn the content quickly	52.298	35.236	12.466	0	0
	Improve learning efficiency	50	35.215	14.785	0	0
Give expectations	Social media models are easy for me	55.815	32.387	11.798	0	0
	Social media makes learning more interesting	52.941	32.348	14.711	0	0
Use attitude behavior	Like to use this pattern in learning	50	41.348	8.652	0	0
	Expect to use this pattern in the future classroom	50	38.298	8.757	0	2.945
	This pattern can be extended to other subjects	50	35.236	8.874	2.945	2.945
	It is necessary to teach the pattern of the pattern	47.064	41.168	11.768	0	0

III. D. 2) Analysis of test score results

This paper analyzes the effect of the role of social media in the digitization of English education in a controlled experiment, where students in the experimental class were taught English using social media and the control class was taught using traditional media, and the experiment was prepared as follows:

Independent variable: traditional multimedia and social media.

Dependent variable: students' English learning achievement, English teaching quality.

Irrelevant variables: initial grades of the two classes, teachers, teaching objectives, post-test papers.

Before the experiment, the final grades of the last semester (2022-2023 second semester) of the students in both classes were analyzed, the content of the papers had some validity, and the results of the grades were analyzed using SPSS.

The results of the final English examination of the last semester of the experimental and control classes were analyzed before starting the teaching practice.

After the completion of the experiment, the two classes need to do the same test paper for the effect test, and the content of the test paper has a certain validity. The total score of the test paper is 100 points, and the test results are shown in Table 3. By comparing and analyzing the scores of the experimental class and the control class, it can be found that after the practice is carried out, there is a significant increase in the average academic performance of the students in the experimental class than the students in the control class, with an improvement of more than 5

points, and the average value is increased by 6.337%. It can be seen that the use of social media for teaching can help students improve their academic performance more significantly, and in terms of the standard deviation of the experimental results, the gap between the students in the experimental class is narrowing, and each student's performance has improved significantly, while the class without the use of social media for teaching is the same as the previous one, with strong fluctuation in performance, and there is a big difference in the learning level between the students in the same class. . Comparison of the above data can be found that the overall difference in the learning level of the students in the experimental class is narrowing, achieving the purpose of the experiment.

From the above analysis results, it can be found that the social media teaching mode has a great influence on students' English performance. Comparative analysis with SPSS using independent samples t-test to further study the actual role of social media teaching on English teaching, post-test t-test results data can be seen that the sig value of the variance equation is 0.145, which is higher than 0.05, indicating that the test object belongs to the same category. The sig value of the mean equation is 0.004, which is lower than 0.05, indicating that the test subjects differ significantly. This indicates that the students in the experimental class have a better understanding of the knowledge points and learn better in the social media based teaching and learning environment.

Table 3 Examination results and analysis

/	Variable	N	Minimum value	Mean	Standard deviation
Class	1	35	68	88.484	7.869
	2	35	60	83.211	9.245
/		F	Sig.	T	Sig. (Double side)
Grade	Let's say the variance is equal	3.892	0.145	1.548	0.004
	Let's say that the variance is not equal			1.506	0.004
/		Mean difference	Standard error value	95% confidence interval of the difference	
				Lower limit	Upper limit
Grade	Let's say the variance is equal	3.415	0.918	1.548	5.416
	Let's say that the variance is not equal	3.415	0.918	1.548	5.416

IV. Conclusion

Based on social media technology, this paper carries out online English teaching and builds an efficient English classroom from four aspects, including social interaction. The Lian Li DNN and CBLM models are used to jointly predict students' English learning performance, and at the same time, the improved BP neural network model is introduced to evaluate the quality of English teaching. Predicting the English scores of 1000 students, the predicted scores and real scores are 472.456 and 469.526, respectively, and the error of both is 2.93, which makes the prediction effect better and has high application value. The quality of teaching was assessed, and the mean value of the predicted results for 13 students was 88.653, and the difference between the real assessment and the predicted results was around 0.576. Students' performance expectation of acceptance and satisfaction of the English teaching mode of social media is above 80%, and independent samples t-test is used to compare the learning effect of the two classes to further study the actual effect of social media teaching on English teaching, and the results show that the sig value of the mean equation is 0.004, which is less than 0.05, which indicates that the difference of the test object is significant, and the students of the experimental class understand the knowledge points higher and learning effect is better.

References

[1] Kazakova, E. I. (2020). Digital transformation of pedagogical education. Yaroslavl Pedagogical Bulletin, 1(112), 8-14.

[2] Javed, F. (2024). Digital Transformation in Teaching and Learning of English in Higher Education. In Digital Transformation in Higher Education, Part B: Cases, Examples and Good Practices (pp. 103-125). Emerald Publishing Limited.

[3] Li, V. (2017). Social media in English language teaching and learning. International Journal of Learning and Teaching, 3(2), 148-153.

[4] Amin, B., Rafiq, R., & Mehmood, N. (2020). The impact of social media in English language learning. Journal of Critical Reviews, 7(10), 3126-3135.

[5] Al Arif, T. Z. Z. (2019). The use of social media for English language learning: An exploratory study of EFL university students. Metathesis: Journal of English Language, Literature, and Teaching, 3(2), 224-233.

[6] Han, S. (2022). Flipped classroom: Challenges and benefits of using social media in English language teaching and learning. Frontiers in Psychology, 13, 996294.

[7] Ariantini, K. P., Suwastini, N. K. A., Adnyani, N. L. P. S., Dantes, G. R., & Jayantini, I. G. A. S. R. (2021). Integrating social media into English language learning: How and to what benefits according to recent studies. NOBEL: Journal of Literature and Language Teaching, 12(1), 91-111.

[8] Kutubkhanah Alsaied, H. I. (2017). Perceived effectiveness of social media as an English language learning tool. Arab World English Journal (AWEJ), 8(1), 79-93.

[9] Dhanya, G. (2016). Influence of social media on English language learning. Journal of English Language and Literature (JOELL), 3(1), 105-110.

[10] Songxaba, S. L., & Sincuba, L. (2019). The effect of social media on English second language essay writing with special reference to WhatsApp. Reading & Writing-Journal of the Reading Association of South Africa, 10(1), 1-7.

[11] Ansari, J. A. N., & Khan, N. A. (2020). Exploring the role of social media in collaborative learning the new domain of learning. Smart Learning Environments, 7(1), 9.

[12] Jawad, I. A., Rajab, A. B., Sharif, S. F. A., Hussain, A., & Wassif, S. J. D. (2024, December). Leveraging Social Media for Collaborative English Language Learning. In 2024 International Conference on Emerging Research in Computational Science (ICERCS) (pp. 1-5). IEEE.

[13] Martínez-Carrasco, R. (2018). Social media in L2 education: exploring on-line collaborative writing in EFL settings. Innovative language teaching and learning at university: integrating informal learning into formal language education, 17-26.

[14] La Hanisi, A., Risdiany, R., Dwi Utami, Y., & Suliswero, D. (2018). The use of WhatsApp in collaborative learning to improve English teaching and learning process. International Journal of Research Studies in Educational Technology, 7(1), 29-35.

[15] Wenming Wang & Min Jia. (2024). A facial expression recognition network based on attention double branch enhanced fusion. PeerJ. Computer science,10,e2266.

[16] Xing Hui Zhu,Kai Run Li,Yang Jun Deng,Chen Feng Long,Wei Ye Wang & Si Qiao Tan. (2024). Center-Highlighted Multiscale CNN for Classification of Hyperspectral Images. Remote Sensing,16(21),4055-4055.

[17] Dhivya Praba Ramasamy,Kavitha Kanagaraj & Jasmine Kumarasamy. (2025). A hybrid heuristic model for video surveillance-based on object detection and video anomaly classification using optimized Bi-LSTM-RBF. Signal, Image and Video Processing,19(6),465-465.

[18] Wang Chen. (2023). Teaching quality evaluation of college civic and political science courses based on BP neural algorithm. Journal of Computational Methods in Sciences and Engineering,23(6),3093-3102.

[19] Li Nan. (2023). A Deep Learning Algorithm for Evaluating the Quality of English Teaching. International Journal of Computational Intelligence and Applications,22(03),