Retraction

Retracted: Design and Construction of Multimedia Smart English Teaching Platform Based on RBF Algorithm

Advances in Multimedia

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Q. Li, "Design and Construction of Multimedia Smart English Teaching Platform Based on RBF Algorithm," *Advances in Multimedia*, vol. 2021, Article ID 7551310, 7 pages, 2021.

Research Article

Design and Construction of Multimedia Smart English Teaching Platform Based on RBF Algorithm

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With the economic development in our country, there are more and more international exchanges and communications. Hence, the ability to read, write, and communicate in English is essential and very necessary. In traditional English classroom teaching, teachers are the disseminators of knowledge, whereas students only receive knowledge passively. Due to the limitation of teaching hours and the lack of teaching approaches, it is necessary to make up for the insufficiency in the teaching activities through computer technology and multimedia technology. Abundant teaching approaches can cultivate the independent inquiry ability of students, and the establishment of such an English learning platform is conducive to improving the students' ability to make full use of the information technology. Through teaching and learning, the students can become the main entity in the English teaching, which can stimulate their enthusiasm and form a good awareness for English learning. In this paper, the radial basis function (hereinafter referred to as RBF for short) algorithm is adopted. Combined with the constructive English teaching method, practical design and construction are carried out by analyzing the concepts, principles, and application strategies of smart classroom teaching in the multimedia background. The practice has proved that the method proposed in this paper is effective and has certain research value and positive significance for the research on English teaching.

1. Introduction

With the economic development in our country, there are more and more international exchanges and communications. Hence, the ability to read, write, and communicate in English is essential and very necessary. As the development of information technology is conducive to helping the students improve their ability to master English quickly, the students have put forward higher and higher requirements for English teaching, and the traditional English teaching model can no longer meet the demand of teaching. Scholars both at home and abroad are exploring the autonomous and constructive English teaching approaches, and they make use of information technology to investigate the relevant teaching approach [1–3]. Through the theoretical research on the neural network algorithm based on RBF, the practical

exploration is carried out on the constructive English learning platform so that students can be immersed in English learning situation.

In college English teaching, more and more evidence has indicated that traditional teaching approaches can no longer meet the new demand of English teaching [4–6]. The brand-new teaching approaches represented by MOOC and others have promoted the development of English teaching to a new height, where the existing English teaching resources can be effectively integrated to improve the teaching efficiency [7]. In this paper, practical design and construction are carried out based on the RBF algorithm. The constructive English teaching method is combined through the analysis of the process of smart classroom teaching in the multimedia background with the purpose to improve the teaching efficiency.

2. English Learning Platform Based on the RBF Algorithm

2.1. RBF Algorithm. The RBF algorithm, also known as the radial basis function algorithm, is a neural network that is composed of locally adjusted neurons and has a five-layer network model in general, as shown in Figure 1.

The first layer is the information factors related to the case. These input values can be summarized into various English project indexes and input into the structure of the neural network. The second layer is the membership function, and its mathematical expression is shown in the following equation:

$$\mu_{ij}(x_i) = \exp\left[\frac{(x_i - c_{ij})}{\sigma_j^2}\right] \quad i = 1, 2, \ldots, r; \; j = 1, 2, \ldots, u. \tag{1}$$

The third layer describes the number of fuzzy rules. Through the learning of samples, attempt is made to make the number of learned rules as few as possible and as significant as possible. Among them, the mathematical calculation of the output of the first rule is shown in the following equation:

$$\varphi_j = \exp\left[-\frac{\sum_{i=1}^{r}(x_i - c_{ij})^2}{\sigma_j^2}\right] = \exp\left[-\frac{\|X - C_j\|^2}{\sigma_j^2}\right], \quad j = 1, 2, \ldots, u. \tag{2}$$

In the above equation, $c_j = (c_{1j}, \ldots, c_{rj})$ stands for the center of the j-th RBF unit. The feature of the RBF neural network is that the closer the neuron is to the center, the higher its activation degree is, which is highly in line with the teaching mode of the constructive English learning influencing factors [8, 9].

The fourth layer is the normalization layer. The nodes in this layer should be consistent with the fuzzy rule nodes, and the output of the j-th node N_j is described in the following equation:

$$\varphi_j = \frac{\phi_j}{\sum_{k=1}^{N} \phi_k}, \quad j = 1, 2, \ldots, u. \tag{3}$$

The fifth layer is the output layer, and its function is to output the scores of each skill in English listening, speaking, reading, and writing. It is mainly based on the TS fuzzy model in the RBF algorithm, and its output is shown in the following equation:

$$y(x) = \frac{\sum_{i=1}^{u}\left[(a_{i0} + a_{i1}x_1 + \cdots + a_{ir}x_r)\exp\left(-\|x - c_i\|^2/\sigma_i^2\right)\right]}{\sum_{i=1}^{u} \exp\left(-\|x - c_i\|^2/\sigma_i^2\right)}. \tag{4}$$

In the above equation, w_k stands for the connection mode of the first rule, that is, the sum of the weight products of the output variables, as shown in the following equation:

$$y(x) = \sum_{k=1}^{u} w_k \cdot \varphi_k. \tag{5}$$

For the purpose of implementing the simplification of the RBF algorithm, the second layer, the third layer, and the fourth layer can be summarized into the hidden layer. The first layer and the fifth layer can be taken as the input layer and the output layer, respectively.

2.2. Model Implementation. The model for the constructive English learning platform based on the RBF algorithm mainly refers to the application of the concept of the RBF algorithm in the design of the constructive English learning platform, which has fully reflected the algorithm in the process of writing the relevant code [10–13]. At the implementation level, the model algorithm can meet the requirements of teachers and students. The RBF algorithm can be used to resolve the quantitative indexes of English teaching and implement the optimization, especially at the teacher level. With respect to the students, the algorithm mainly solves the learning performance in different learning status and task progress. The algorithm model for the students is shown in Table 1.

Based on the algorithm model, mainly the performances of students in the national CET-4 and CET-6 English exams are investigated. The hidden layer is corresponding to the different contents of the learning materials, and the output layer is the score of each subject. In this way, the optimal total score of the national CET-4 and CET-6 English exams can be obtained by calculation, and the proportion of the time spent can be compared accordingly. For the purpose of obtaining the learning pattern of students with good English proficiency, the data of freshmen and sophomore students who have participated in CET-4 and CET-6 exams in some colleges and universities in a certain province are collected, and more than 7,000 students who have taken the exams are selected. Among them, nearly 3,200 students passed the CET-4 and CET-6 examinations. Hence, the base model for the students with good performance can reflect the good English learning habits to a certain extent, as shown in Table 2.

3. Design and Implementation of Multimedia Teaching Platform for English Learning

3.1. Autonomous English Learning. In general, scholars at home and abroad believe that autonomous learning means that students are responsible for controlling their own learning. Thus, autonomous learning has better subjective initiative, learning feedback, and self-directed adjustment. Many foreign scholars have summarized autonomous learning into four key points, that is, comprehensiveness, ability, environment, and responsibility. Autonomous learning models can be divided into two main types, which are mainly based on the teaching venues, including two modes, that is, classroom autonomous learning and extracurricular autonomous learning. Extracurricular-independent learning is the commonly conducted preparation before class, review after class, and self-selection of reference books. This type of learning mode requires the students to complete their learning independently without the assistance of external forces. The autonomous learning in the classroom is
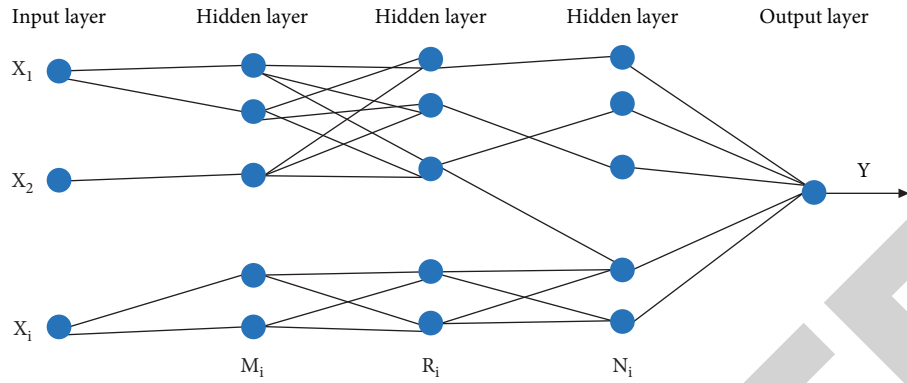
FIGURE 1: Structure diagram of the RBF algorithm neural network.

TABLE 1: Student algorithm model.

| Input layer (time) | Hidden layer (transformation function $C_j\sigma_j$) | | | | Output layer (scores) |
	Fields of reading	Range of vocabulary	Knowledge point	Grammar	
Spoken English	Economics	Word	Vocabulary	Noun	Scores
English writing	Politics	Phrase	Tense	Adverb	Scores
English listening	Technology	Statement	Voice	Pronoun	Scores
English translation	Literature	Paragraph	Reading	Adjective	Scores
English reading and comprehension	Philosophy	Chapter	Clause	Article	Scores
Correction of error	Information technology	......	Slang	Verb	Scores
......	......		......	......	
Total					Total

TABLE 2: Models of students who have good performances in CET-4 and CET-6 exams.

| Input layer (time) | Hidden layer (transformation function) | | | | Output layer (scores) |
	Fields of reading	Range of vocabulary	Knowledge point	Grammar	
Spoken English 15%	Economics 25%	Word 30%	Vocabulary 25%	Noun 20%	Scores 25%
English writing 5%	Politics 30%	Phrase 10%	Tense 10%	Adverb 10%	Scores 10%
English listening 20%	Technology 15%	Statement 35%	Listening 30%	Pronoun 10%	Scores 35%
English translation 10%	Physical education 10%	Paragraph 20%	Reading 20%	Adjective 20%	Scores 15%
English reading and comprehension 45%	Philosophy 10%	Chapter 5%	Grammar 10%	Article 20%	Scores 15%
Correction of error 5%	Information technology 10%		Slang 5%	Verb 20%	
Total 100%	100%	100%	100%	100%	Total 100%

often affected by the teachers, where the students and the teacher can cooperate with each other to obtain better learning effects. In comparison, autonomous English learning means that students develop plans for English learning based on their own learning goals and carry out self-supervision in the learning process so as to achieve a sound English learning effect. Its theoretical basis is mainly the constructivism, humanism, and cognitivism of modern educational psychology [14, 15]. These three aspects focus on the emotion, cognition, and environment of students in the process of their English learning to implement autonomous learning. The integration of the three theories described above has provided the basic theory for high-quality educational concepts.

3.2. Constructive Teaching. In the activities of English learning, the constructive teaching model is a dual main entity mode implemented mainly based on the students as the main entity and the teachers as the main guidance. In this model, the two perspectives of teaching and learning are combined to improve the abilities of students in the five aspects of English learning, listening, speaking, reading, and writing by using the advanced teaching concepts with the integration of the information technology and multimedia technology. The objects of the constructive teaching design are composed of three aspects: the learning environment, the learning activities, and the media delivery. The design of the learning activities is a combination of learning tools and

learning resources based on network resources as the carrier, which allows the students to experience the learning content and evaluate their own learning results during the learning process. Through the application of the learning tools based on the multimedia technology, boring and dull English learning contents are turned into colorful and vivid video and animation materials, which are represented in the visual and auditory senses. Thus, an open English teaching platform will be conducive to helping the students in their independent learning after class. The networked communication environment can also be conducive to the communication with teachers, which can reflect the leading function of teachers. Hence, a constructive English teaching platform is of a positive significance for improving the English autonomous learning ability of the students.

The network topology of the learning platform is shown in Figure 2.

The distributed network topology structure is established to support various identities and permissions based on the user levels of teachers, students, and administrators. At the same time, the corresponding services are slightly different. The constructive English learning platform is mainly composed of auxiliary training, autonomous learning, audio-visual training, and other modules. The logic diagram is shown in Figure 3.

The composition of each module needs the support of the back-end question bank, which is supported by the SQL Server database so as to implement the automatic management of the system integration and the overall scheme of the data solution method.

3.3. Design of the Platform Database.

The main function of the platform database is the question bank of the English learning courseware. The question bank of the courseware includes true or false questions, reading comprehension, cloze, correction of errors, fill-in-the-blank, and so on. The information list of the database contains test question type information, test knowledge point information, test field information, test grammar information, multimedia file information, test answer information, and other information.

The basic process of the smart classroom can be divided into three parts: before class, during class, and after class. The specific process is described in Figure 4. The process includes teachers and students accomplishing the online and offline learning activities in an environment based on the electronic schoolbags.

From the flow chart, it can be seen that in the process of some teachers and students before class, the teachers mainly prepare lessons and continuously update the teaching resources, including learning materials such as microvideos and text materials provided for the self-study of students before class, and assign the preview tasks to the students accordingly. The activities of students before class mainly include completing the preparatory tasks assigned by the teacher, uploading text, audio, and other related materials, and completing online self-tests before learning, so that they can learn the knowledge by themselves first
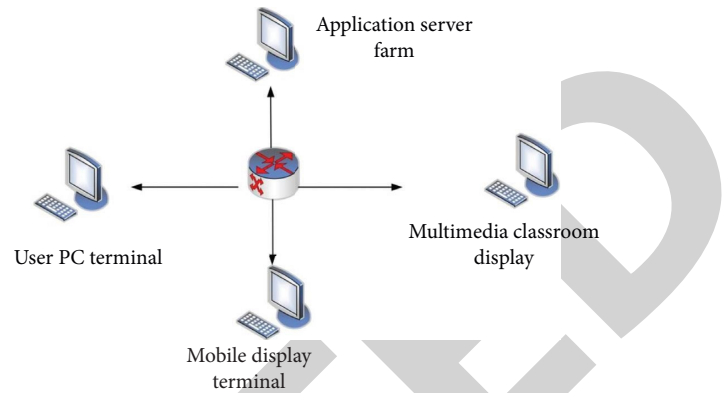

Figure 2: Diagram of the network topology.

before class. The class is mainly divided into six sessions, which are the introduction of spot checks and detection situations, creation of the relevant situations, asking questions, group communication, dialogue exercises, and staged test of the learning effects. The sessions of group exploration and presentation, summarization and expansion, and assignment of homework have highlighted the independent and collaborative learning approaches of the students in the classroom, which can facilitate the students to learn and use language in the context. Finally, the after-school learning activities are composed of two links: the expansion learning and the guidance by the teacher, to complete the diagnosis and remediation of the learning after class and the learning task of expansion and promotion.

3.4. Design and Evaluation of the Learning Platform.

The grades of the students in the English major from a university of science and technology in the province are used to evaluate the effect of the application of the English learning platform based on the RBF algorithm, and the students in the class of 2018 at the language school of the university are selected.

The pass line of the College English Test Band 4 exam scores of the students in the class of 2018 at the language school of the university is set to 425 points, and the significant difference of comparison is set to 5%. For the purpose of comparing whether there are significant differences between students of different grades, the pass rate of the students of the English major in the class of 2017 in the CET-4 English exam is first compared with the pass rate of the students in the class of 2018 (who took part in the CET-4 English exam for the first time). The results indicate that the difference is 1.5% or so, and there is almost no difference. Subsequently, in the class of 2018 at the language school, the CET-4 English exam scores of the students who have used the platform are compared with the students who have not used the platform. It can be observed from the results that the students who have used the learning platform have a better pass rate, which suggests that the application of the platform for the exploration and learning has played a certain positive role, as shown in Figures 5 and 6.
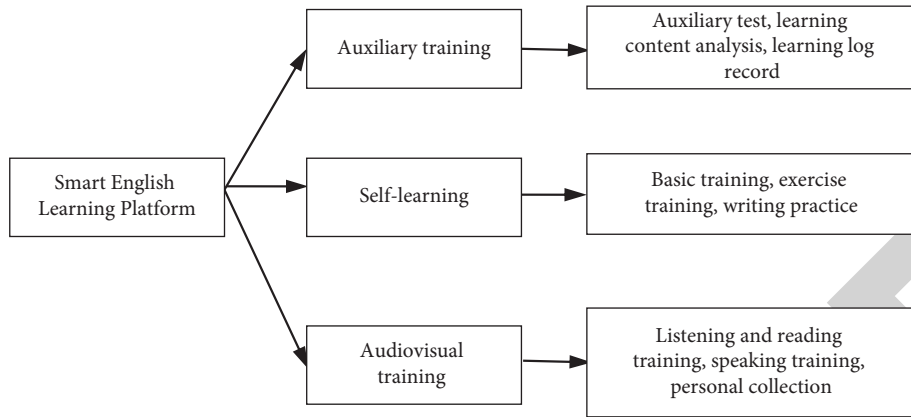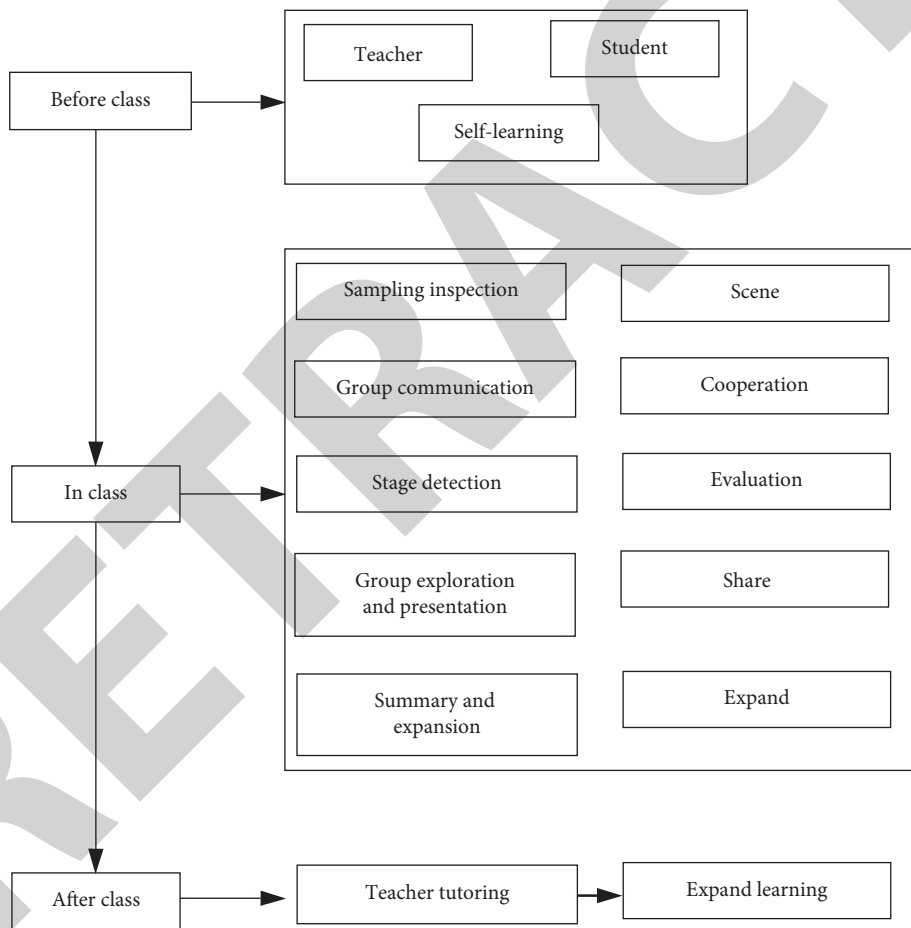
Figure 3: Logic diagram.

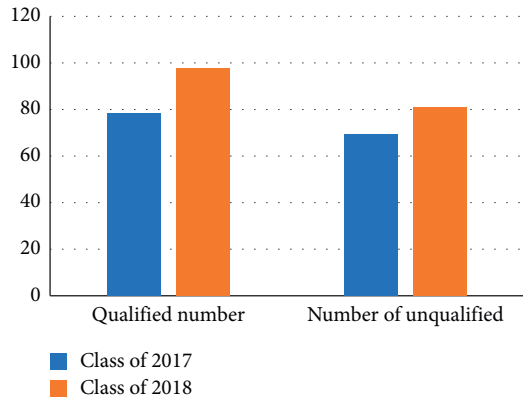Figure 4: Flowchart of smart classroom of English learning.

FIGURE 5: Some students in the class of 2017 and the class of 2018 in the English major who participated in the College English Test Band 4 exam.
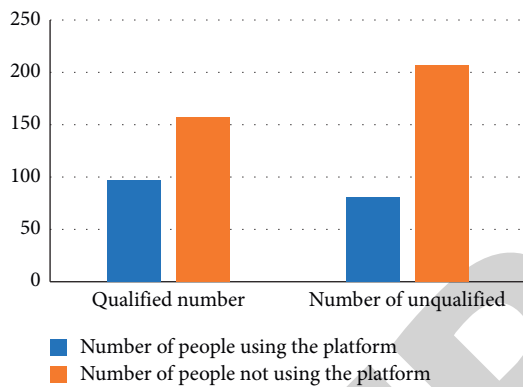

FIGURE 6: Comparison of the pass rates of college students who use the platform and those who do not use the platform in the class of 2018 at the language school.

4. Conclusions

The constructive English learning approach has provided better technical support and learning concepts to English learners. In this paper, the theoretical basis of constructive English learning and current research status both at home and abroad are first introduced, and its advantages compared with traditional English learning approaches are analyzed. In addition, the RBF neural network model is analyzed. In particular, the locally adjusted RBF algorithm is adopted. Taking the training model and construction method based on the RBF neural network into consideration, the learning patterns of excellent English learners in CET-4 and CET-6 exams are simulated. In this way, the effect of the English learning platform can be better exerted so that the English learning platform can play a supporting role in the English learning process of students. The design is evaluated so that the software can be improved more effectively. In the subsequent research, the design of a more user-friendly interface should be included, and model samples with a larger scale should be used to train the model so that it can be more accurate and universal to ensure that it can have excellent stability in the aspect of operation. It is also possible to integrate multiple algorithms to improve the

training algorithm of the RBF neural network to obtain a more universal algorithm model, which should be the key direction of research in the next step.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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