



## Research on Quality Evaluation and Improvement Strategies of College English Teaching Analysis Based on Data Mining

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**Abstract:** In this study, the qualitative assessment is appropriately measured using the fuzzy comprehensive evaluation model, which is based on the bat algorithm. It also offers a practical and user-friendly method of evaluating the calibre of English instruction by fusing objective index data with numerical review. The fuzzy comprehensive evaluation analysis method is used to create the model for evaluating the level of English training and figure out how much each factor is worth. Then, each of the model's three types of data is dealt with separately. One way to do this is to make objective indicators like students' course grades more reliable and lessen the impact of how hard the course is on these indicators. With the help of the bat algorithm and a flexible complete evaluation model, the personal evaluation is turned into a number. In the end, this makes the decision

**Keywords:** Data mining, college, English teaching, education, optimization

### 1. Introduction

Today, schools and colleges need to pay close attention to the quality of their education in order to meet their own growth goals and the needs of their students. The way teachers teach is the best way for schools and colleges to see what level of skill and ability they can reach. This also helps to raise the goals and standards for good teaching. More and more, being able to talk to people outside of work is becoming important as the social economy grows. English has become an important skill for getting along with other people because of this [1]. Tests that use data mining are being added all the time to English classes to help with flexibility, teaching science in English, and multiscale and multiple analysis [2, 3]. This isn't how English was taught before. But because so many things affect how well English is taught, it is hard and useless to judge it by just one thing. Instead, picked is a good way to judge English teachers [4, 5]. That's why it's important to make English classes harder [6]. You need to know English in both high school and college now. These days, database systems can add and change data, do math, answer questions, and more. However, the data's secret value has not yet been fully mined and used. This is a huge waste of data. A lot of colleges and universities are thinking about how to reuse these data. They want to make old management data useful and help school managers make better choices. The

computer system for managing data also has a setting for reviewing in the classroom and some ways for people to use it. It collects data and information that is used by management to make choices and for things like online tests and data figures for students. What's wrong with the teaching quality review method is how it was made, how it's used, and how the rating results are looked at. It should no longer be necessary to learn evaluation theory, use evaluation means, and keep evaluation methods up to date [7]. Some of these ways of judging the quality of English education make sense, but they also have some flaws. For example, the way they judge results isn't always clear, the analytical ranking process (AHP) has big issues, and the nervous system can make hard work harder. It makes a big difference in how well the SVM works when you change its settings, especially when you lower the local limit and train it slowly. A golden sine method was suggested as a way to more accurately rate the skills of college and university English teachers [8]. It comes from the SVM model and how choosing the right parameters changes how well the model works.



Without schools, we can't make our country more creative. Because they learn how to be good at what they do, people who go to college have a lot to do with the growth of higher education as a whole. So, what colleges do, what drives growth, and what higher education is all about is the quality of the teaching. [9]. There are a lot of scholars and experts who want to find ways to make teaching better so that students can learn new skills and the higher education system grows in a way that is organized and helps students. College and university give you unique chances and jobs that have never been seen before. Some things about college are like the way a market economy works. Each school is in a tough race with others, and some are generally better than others. Parents and kids care most about how good the teachers are when they choose a school. We can say the same thing about schools and universities. Get a better sense of what it means to teach in a classroom. It will help you reach your goal of "survival by quality and development by innovation." [10–13]. They might not have enough time or space to consider the most significant issues that affect pupils and society at large. The institution must figure out how to put true, fair, and long-term standards for teaching a wide range of subjects to the test. The primary sources of information used to grade college professors are student evaluations, peer evaluations, and the instructors' own reflections on their own pedagogy. Effective classroom instruction involves students closely, and they benefit from it. [14–15] There are other ways to judge, but the students' review is the most objective, so the results are fairer. There are many issues with the way we rate the level of teaching at the moment. Most of the time, you rate based on the result of adding up the review scores for each topic by their weight. Because the current method for judging English class quality isn't very good, our project is going to use data mining to find useful data and information that can be used as a guide for judging teaching.

## 2. Related Work

These days, computers are always getting better and changing. It also takes less time to make a new version. It seems like

computers are getting more and more attention. Since control tools for English teachers were made available, the amount of work has gone up. Even so, there are some problems with the way English is taught. Either the system doesn't have a way to rate the quality of English lessons, or the one it does have isn't good enough. Query and figures that are a little out of date are used to handle information about the database. The database's features aren't well planned or developed, which will waste some resources [16]. Because of this, we need a set of quality review methods for teaching English that can be used right away and can adapt to new situations. You need to be good at teaching English for this job to be worth it. You need to be able to teach English well if you want to stay alive and get ahead in life. This is what everyone needs to do. If you want to make English teaching better, you need to know what teachers are really good at. You can then help teachers get better at teaching English by letting them focus on what they do best. You can also help them make more money by making their teaching team stronger. English test grades are still used by many higher trade schools to judge how well English is being taught. This is because it is the usual way to do so and because they believe that basic courses should be light and professional courses should be heavy. A lot of the time, formal evaluation is used, but progressive evaluation is also used. It doesn't look at how different parts of the evaluation change over time while the trainer is working with the person, and it doesn't help to generate new ideas and make evaluation items more unique [18].

A very important area of study is coming up with a way to rate the quality of English lessons. We can add to important educational ideas and make a set of evaluation systems that show off the English teaching quality evaluation system by studying it. The second way to find out how good a course is is through English teacher quality review. It can also help management make choices and understand the English lesson better. [19] But school leaders can use the review data to change the curriculum and push for more curriculum building to raise the level of English teaching. How good an English teacher is mostly judged by how well they teach and how well their students learn [20]. These two things are linked: there is a teacher and there are students. The process of learning English is like this. As the ones being taught, the students will be able to judge the teacher's level and style. Because of this, what the students think about the teacher is a key part of the evaluation and the best way to get feedback. If you want to grade kids in a more scientific and accurate way, you need to use a full and scientific



method. This paper talks about how English is taught now, what problems there are, and how English is graded. Our goal is to find a new way to measure the quality of English teaching, create a modern way to measure the quality of English teaching, and make the process of measuring English teaching more scientific, thorough, and fair. This will then lead to better teaching of English [21]. It is being looked into how to rate English teachers in a new way, and it is also being used to help plan college courses. This can give people in charge of college English teaching both theoretical and real-world examples that can help them come up with a way to judge the quality of English teaching.

The goal of this project is to create and use an all-encompassing and unbiased method for users to rate the quality of English training by teachers. The system is not like other ways of evaluating because it uses both qualitative and numeric review.

It converts the test takers' subjective assessments into numerical evaluations by utilizing natural language processing. Both severe bias in the qualitative evaluation and missing indicators in the numerical evaluation will no longer be a concern for you [22]. Apart from that, the approach facilitates the rating of English instructors' effectiveness by individuals worldwide. The outcomes of the teacher evaluations and the models created for assessing the caliber of English lessons presented by teachers are also visible to managers of English teaching quality. The introduction discusses the background of the study, defines ELT assessment, and highlights the significance of the research from both an academic and a practical standpoint. [23] This study's second section examines the problems that arise and how to assess the current state of English instruction. In the third part of this study, we look into how the fuzzy thorough evaluation of the bat method can be used to rate the quality of English training. The improved bat algorithm was used to create the fuzzy full evaluation model of English teaching quality. This was done by looking at the factors for judging English teaching quality.

This methodology was also employed in the development of the assessment framework. [24] I look at studies that rate the quality of English teaching in the fourth portion of this study. In the fifth portion of this paper, I draw conclusions from the study and talk about its flaws. It offers a summary and analysis of the full paper as well as suggestions for additional reading and research subjects. A strong management structure for teaching the language should be developed, in addition to an emphasis on staff development, careful supervisor selection, making sure that everyone knows their role, and putting in place an efficient English teaching assessment system. This will help to improve the caliber of English teaching and lay the groundwork for the institution's sustainable, long-term, and creative growth.

### **3. The Fuzzy Comprehensive Evaluation of Bat Algorithm Was Used to Look into How to Rate How Well English Is Taught.**

#### **3.1 English Evaluation Index for Quality Of Teaching**

There should be different English teaching quality review numbers for each subject so that English teachers can better understand and help their students. When you teach English, you should focus on looking at links that are useful for teaching English. It's not the same thing as judging academic classes and real training courses. In the review forms, the main point of the study should be written along with the course goals and teaching features of each. There won't be a fair and objective evaluation of English teaching quality if there aren't any scientifically sound and measured signs and the idea of evaluation isn't made clear.

The scientist's goal in ELT activities is to improve students' five competencies: brain skills, cognitive techniques, vocal knowledge, and physical skills. These five English as a foreign language skills are also part of the three areas of movement skills, cognitive skills, and emotional skills. There is a focus on developing other important skills, like students' ability to think for

themselves and learn quickly, which mainly helps to develop their intelligent sides. The ELT process is made up of a lot of different kinds of parts. These parts decide how good ELT is. The ELT setting, the ELT methods, the teachers, the students, the course, and the ELT comments are the most important ones. The outcomes and

conclusions drawn by examining the entire ELT process are reliable. The approach consists of 14 minor indexes and 4 major indices. The letter A represents primary indexes on this page, whereas the letter B represents secondary indexes. Every item in Table 1 is composed of a distinct substance.

Table 1: A Method for Judging the Quality of English Lessons.

Research evaluation object	First-level indicator	Meaning of first-level indicators	Secondary indicators	Meaning of secondary indicators
English teaching quality	A	Teaching objectives	A1	Training goals and teaching plan
			A2	Improve learning ability
	B	Teaching content	B1	Subject new theory and practice related
			B2	Focus on key points and teach students by their aptitude
	C	Teaching methods and methods	C1	Independent thinking and flexible approach
			C2	Diversified teaching methods and diverse assessment methods
	D	Teaching effect	D1	Teaching goals and research capabilities
			D2	Innovation quality and academic quality

The English Language Teaching (ELT) goals are what the curriculum is based on, what the learning results should be, where the curriculum starts, and how the tasks are planned. It's important for the training to include both exercise and theory so that the information is more useful. To get good results with English teaching, teachers should be chosen based on the goals for teaching English and the tasks that students need to complete. Most of today's education is focused on developing creative and useful skills, so teachers shouldn't just start with what their students have already learned; they should also add to what they've learned in the classroom by having them practice outside of school. This will help them develop their creative and research skills.

### 3.2 With the Help of The Enhanced Bat Algorithm, A Fuzzy All-Around Evaluation Model

In this study, a model for evaluating English lesson quality is constructed using the bat algorithm. The model has three components: handling numerical assessment data, establishing standards for objective index data, and researching emotional assessment. The left branch handles everything on the left, whereas the right branch creates the standard by which English teachers are evaluated. For starters, we set up a planned link between parts that are related. Next, we make a decision grid for the level that was picked and check to see if it is correct. Last, we figure out how much each part of the level is worth. So, these two parts are given by trained professionals who have the right skills, years of experience, and well-known ways to check the quality of English lessons (Figure 1).

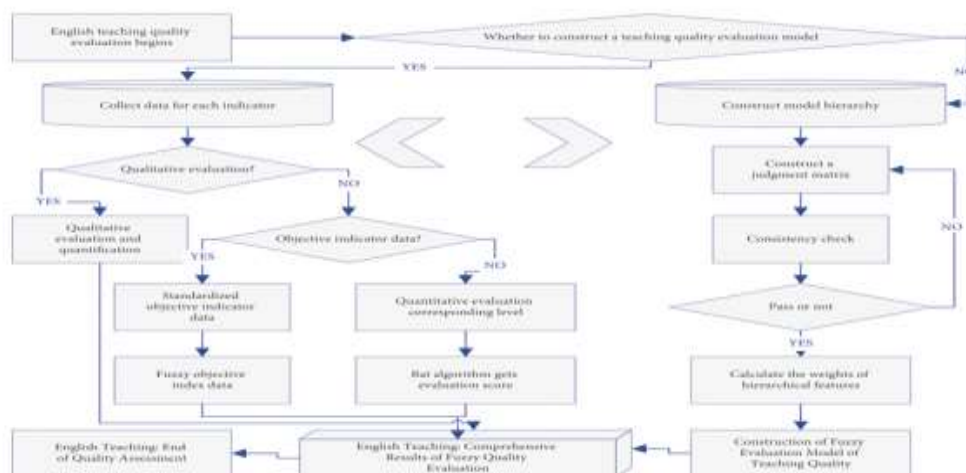


Figure 1: Flowchart For Building A Model For Evaluating The Quality Of English Training.

Since there is no information about the population that can be used ahead of time, a chance method is usually used to set the population's starting place. This way makes it more likely that bats will be spread out unevenly, which slows down the convergence speed of the program. When you plug in  $\beta$  as the control parameter and  $B(t)_i$  as the value of the  $i$ th chaotic variable after  $t$  chaotic maps, you get (1).

$$B(t+1)_i = \beta * B(t)_i * (1 - B(t)_i), \quad i \in [1, N] \quad (1)$$

Some intelligent optimization algorithms, like the particle swarm algorithm and the traditional bat algorithm, tend to get too close to the local optimal individual and fall into it.  $B_i$  is the present person's function fitness value,  $\text{avg}(B)$  is its mean value,  $\min(B)$  its lowest value,  $\max()$  its highest value, and  $\min()$  its lowest value. You can write this equation as (2).

$$w = \max \left( \min(w) + \frac{(\max(w) - \min(w)) * (B_i - \min(B))}{\text{avg}(B) - \min(B)}, \max(w) \right) \quad (2)$$

What part does each point in a collection play in the grouping? It depends on how many other samples are close to it. It makes the grouping finding stronger, so the weight is higher, if more samples are taken around the point. The weight is lessened when fewer samples are gathered around the point. This makes the grouping finding less strong. With  $\beta = 0$  and  $i = 1, 2, \dots, N$ , equation (3) tells us how close each sample point is to the others.

$$f(x)_i = \sum_{j=1}^N \ln(\beta * (x_i - x_j)^2) \quad (3)$$

The coefficient of variance is a number that shows how different each characteristic is from the rest of the data. The characteristic that best shows the difference between the data items will have more weight if its numbers vary a lot.

$$f(x) = \frac{\sqrt{(1/(n+1)) \sum_{i=1}^n (x_i - x_{i-1})^2}}{(\sum_{i=1}^n x_i)/n} \quad (4)$$

$$w_i = f(x) / \sum_{i=1}^N f(x_i) \quad (5)$$

While  $N$  is the number of traits, Equation (6) shows the weight equation for each one.

$$w_i = f(x) / \sum_{i=1}^N f(x_i) \quad (6)$$

We use the fuzzy comprehensive evaluation method and give the goal function sample weights ( $u_i$ ) and attribute weights. With the better bat formula, this makes it work better. It is the main job of the updated fuzzy comprehensive assessment method to

$$H(u, w) = \sum_{i=1}^n u_i + \sum_{i=1}^N w_i (x_i - u_i)^2 \quad (7)$$

You can get the iterative update formula for the fuzzy association degree  $u_i$  by

$$u_i = \sum_{i=1}^N w_i (x_i - u_{i-1})^{1/m-1} \quad (8)$$

Not just in a general way; to know how much each factor falls into the categories of "excellent," "good," "moderate," "pass," and "to be improved." One way to do this is to check out how strong each point is. (8) shows the method that can be used to find the degree value of each factor. In this case, E(i) is the degree coefficient of the ith factor and H(i) is the degree to which each grade in the evaluation matrix H is connected to the ith factor. This picture, M(i), shows how to change the grade factors.

$$E(i) = \left( \sum_{j=1}^n H(i) * M(i) \right)^{-1} \tag{9}$$

### 3.3 Plan to Check the Quality of English Teaching

Because of this, the place where English is taught needs to be improved and more help needs to be added to it. To do this, they need to give students current English teaching tools and different places to learn English. They should also set up an English learning centre with help and have foreign master teachers teach on campus on a daily basis to help students learn more and become more professional.

The school's software infrastructure services will never be able to match the needs of training in practical skills if they have to deal with a constant and limited supply of software infrastructure. If the software infrastructure doesn't match the way applied talent is developed, it will become a major issue that stops English teachers in applied undergraduate institutions from improving their lessons.

The layout of the system is made up of three layers: the show layer, the business layer, and the data layer. The layer closest to the user is the display layer, which mostly shows information and lets the user interact with it.

## 4. Result

### 4.1 What's Reasonable a Test of The System for Judging the Quality of English Teaching in Colleges and Universities

#### 4.1.1 A study of how reliable the teaching rating score method is

The truth scores and indicators for teaching load are shown in Table 2. The content validity index is I-CVI, the PC content validity standardised value is K', and the modified validity index value is Pc. The decision data from experts were used to find each content validity index and its normalised value. This was done to see if the index system had good content validity. The evaluations from 10 experts showed that the indicators were seen as one of the 8 secondary indicators by those 10 experts. Both the I-CVI and K numbers were 1, which means that these indicators were valid in terms of what they showed. The number for getting in as a student was 3.2, and the I-CVI was 0.852. Once the PC was fixed, though, the K number went up to 0.82, which is higher than 0.74, and the review scored still passed.

Table 2: How Many Quality and Useful Points Are There for The Training Load?

Target	Experts score mean	I-CVI	Pc	K'	Evaluation grade
Course quality	4	1.0	0.031	1.0	Excellent
Teaching management	3.8	1.0	0.031	1.0	Excellent
Teaching methods and contents	4	1.0	0.031	1.0	Excellent
Student satisfaction	3.8	1.0	0.031	1.0	Excellent
Students continue to learn the beat	4	1.0	0.031	1.0	Excellent
Student acceptance	3.2	0.852	0.096	0.82	Excellent
Knowledge imparting effect	4	1.0	0.031	1.0	Excellent
Academic performance	3.8	1.0	0.031	1.0	Excellent

4.1.2 *Test of Measuring Things That Affect the Model for Judging the Quality Of Teaching*

Once the data is standardised, the differences between the different value ranges and signal scales are taken away. In Table 3, you can see the association coefficient matrix for each measure. The table shows that 24 of the association coefficients have values above 0.5 and 12 have values above 0.8. This number, 0.991, shows that there is a strong link between the eight evaluation measures that were picked. This is what factor analysis needs to work.

Table 3: The Set of Association Coefficients for The Rating Index

	Course quality	Teaching management	Teaching methods and contents	Student satisfaction	Students continue to learn the heat	Student teaching acceptance	Knowledge imparting effect	Academic performance
Course quality	1							
Teaching management	0.817	1						
Teaching methods and contents	0.750	0.991	1					
Student satisfaction	0.718	0.942	0.822	1				
Students continue to learn the heat	0.851	0.612	0.377	0.246	1			
Student acceptance	0.921	0.751	0.612	0.671	0.725	1		
Knowledge imparting effect	0.752	0.612	0.821	0.923	0.321	0.863	1	
Academic performance	0.511	0.881	0.827	0.815	0.241	0.614	0.832	1

In Table 4, you can see that the study of the measurement indicator model did well. Each latent variable had a standardised factor loading of 0.816, 0.921, 0.752, 0.845, 0.832, 0.802, 0.814, and 0.786. This means that they were all greater than 0.75 and the factor coefficients were all significant (P<0.001). All of the hidden variables had average variance extractions (AVEs) that were greater than 0.65, and all of their individual reliabilities were greater than 0.9. All of the measurement index models match up well, which means they are all correct.

Table 4: Results Of Evaluating the Measurement Model

Potential variable	Target	Standardized factor load	Significance level(P)	Component reliability(CR)	Average variance extraction (AVE)
Teaching efficiency	Course quality	0.816	***	0.901	0.651
	Teaching management	0.921	****		
	Teaching methods and contents	0.752	***		
Student evaluation	Student satisfaction	0.845	***	0.921	0.668
	Students continue to learn the heat	0.832	***		
	Student acceptance	0.802	***		
Learning efficiency	Knowledge imparting effect	0.814	***	0.912	0.653
	Academic performance	0.786	***		

4.2 **A Look at The Things That Are Used to Judge the Quality of English Classes in Colleges and Universities**

Table 5 displays the results for each level of the metrics used to judge the quality of instruction. The quality of instruction is the first level; effectiveness of instruction, or how well students believe it works and how quickly they learn, is the second level; and the quality of teachers' courses, or how they conduct their classes, the techniques and material they employ, the joy and excitement with which their students approach learning, and the

degree to which they accept teaching, is the third level. Speed with which people share and learn new things. There are three sets of scores, and all of them are above 90. The scores for teaching management are 98.51, and the scores for teaching training are 98.12. Thus, the way classes are run and the number of students have a lot to do with how well teachers do their jobs.

Table 5: Three-Level Measure for Judging the Quality of Teaching

Primary index	Secondary index	Tertiary index	Score	Weighting ratio	weighting	
Quality of teaching	Teaching efficiency	Course quality	98.12	21%	20.57	
		Teaching management	98.51	41%	40.52	
		Teaching methods and contents	91.23	38%	35.99	
	Total				100%	95.12
	Student evaluation	Student satisfaction	94.21	33%	23.12	
		Students continue to learn the heat	91.11	22%	21.24	
		Student acceptance	93.00	45%	42.47	
	Total				100%	93.64
	learning efficiency	Knowledge imparting effect	95.54	46%	44.72	
		Academic performance	97.12	54%	51.98	
	Total				100%	95.75

### 4.3 An Empirical Study of How to Judge the Quality of English Lessons

Table 6 shows the results of the three-level measure in figuring out how well English is taught to students at S University. S University is one of the most important building schools in S county. Twenty college students who have taken English classes, four English teachers at S school, and two teaching management teachers in the Academic Affairs Office at S school will be chosen at random to take part in the poll. A system for rating the caliber of English instruction at colleges and universities will be developed using the results of the poll. A total of 26 surveys were sent out, and 26 of them were returned, meaning that all 26 were located. By adding the weights of the three-level indications to the total expert grade on each indicator, two integers are omitted. You can see the score for those indicators here.

Table 6: Expert Advice Answers for Tertiary Factors

Primary index	Secondary index	Score	Tertiary index	Score	
Quality of teaching	Teaching efficiency	1.72	Course quality	1.94	
			Teaching management	1.84	
			Teaching methods and contents	2.23	
	Student evaluation	1.24	Student satisfaction	1.98	
			Students continue to learn the heat	1.89	
			Student acceptance	2.10	
	learning efficiency	0.89	Knowledge imparting effect	2.34	
			Academic performance	2.01	
	Data conversion standard				
	Excellent	Well	common	Qualified	Bad
Score	5	4	3	2	1

### 4.4 Comments on How to Make English Training Better

When new technologies like micro classes and other new teaching platforms are fully utilized, they not only give students a wealth of information, but they also make learning more fun through human-computer interaction, which in turn motivates students to actively learn English. Colleges and universities need to actively bring in a wide range of new tools and equipment to make the classrooms current and high-tech.



Second, schools and universities should offer cross-cultural classes to help students learn about the English cultural background. Students can learn about how English-speaking and Western countries have changed over time by taking history classes at colleges and universities that are related to their studies.

## 5. Conclusion

We need to find new teachers, change how they are trained, and improve the level of English teaching by looking at how well English is taught. Also, it helps keep official English lessons going for a long time. On the other hand, the current study on the level of English education and the polls that students themselves filled out show that students are not getting better at both speaking and writing English at the same rate. Also, they show that teaching English and getting a job are not really related. Some problems were found with the bat programme that had to be fixed. Then, the old bat programme was compared to the new one. It turned out that the better way got better results and sped up the convergence process a bit. It was possible to make the better way work, as shown. This leads to the idea of a better fuzzy comprehensive evaluation algorithm that is based on the better bat algorithm. This would fix the problems with the flexible thorough evaluation method that is used now. This helps in the selection of the initial point and considers the ways in which various groups and attributes might alter the results of grouping. Based on a rate scale, the bat algorithm's adaptable comprehensive evaluation model aggregates the qualitative ratings. Then, numbers are given to the groups of reviews that meet the criteria. These numbers are then fed into the rating model so it can do the maths. Finally, this makes the rating better and fairer. Models could be run in the better way, and the set results were more accurate. The last step is to use the better fuzzy comprehensive evaluation method on the dataset for evaluating the quality of English teachers. The test findings demonstrate that the improved approach can address the problems encountered in attempting to grade the Caliber of English classes and provide a means of gauging that calibre. This study employs a novel approach: the fuzzy comprehensive evaluation model of the self-bat algorithm will be utilized to ascertain respondents' assessments on the Caliber of English instruction provided by teachers. We can determine how effectively instructors are taught in English by adding the results of the numerical exam, the personal test, and actual data such as the grades students received in school.

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