Research Article

Application of Data Mining Technology in the Information Technology of College English Teaching

Zhu Zhimei

Department of Foreign Languages, Heze University, Shandong, 274015, China

Abstract: In this study, we proposed that quality evaluation system and evaluation methods are important and students are made as the main object and multi-level fuzzy comprehensive simplify evaluation model that is suitable for teaching quality of college English is established. Weighing of fuzzy comprehensive mathematical model is improved. We argue that fuzzy comprehensive mathematical model is objective, valid, scientific and feasible through specific English classroom testing.

Keywords: College English teaching, data mining, fuzzy comprehensive methods, information technology

INTRODUCTION

With the development of computer technology and the wide application of database technology and the industry has accumulated a large amount of data which is stored in different forms. But discovering valuable information or knowledge to achieve for decision-making purposes becomes very difficult. Data mining technology is born at the right moment, which makes people have the ability to finally recognize the true value of the data (Feibeng, 2006).

In recent years, data mining technology is widely used in business decision-making, such as business management, production control, market analysis, engineering design and scientific exploration. However, the data mining technology in college English teaching is few. Therefore, we can apply data mining technology to obtain valuable knowledge in these data and guide our teaching (Binhua and Rui, 2001; Hongdan, 2011).

Improvement and effect on English teaching is an important research topic and people generally improved through questionnaires or evaluation, this process is generally achieved through teaching and examinations, research data mining application of information technology in college English teaching provide some theoretical reference and guidance for research in this area (Yanli, 2010).

LITERATURE REVIEW

The most immediate change of college English teaching in information stage is changes of college English teaching content. In recent years, people are talking about the explosion of information or knowledge explosion. Can query the information provided in the world every day increased a hundredfold, anyone from the library or computer network, cheaply or even free to use or get a lot of information. This requires the students to reach the standards required by the College English Syllabus with more language and professional background. Require students to know English common sense, to grasp the higher English skills. However, anyone can not remember or grasp all these information or knowledge and even all the browser again impossible. This contradiction is reflected in the college English teaching, is the rapid increase of the content of the teaching, class tensions, the students are too many things to learn. Only one way to solve this problem: change the teaching ideas, do not look forward to teach students in the university life to learn something, but to help the students to lay a solid foundation language, to master the language learning methods, teach them to obtain knowledge of English and use of the method. The information explosion forced us to go down this road, the development of information technology so that we have a way to do this. Three different college English teaching is shown in Fig. 1.

At the same time, the means of education are changing; Computer-Aided Instruction (CAI) has been developing rapidly in recent years. Since the birth of the multimedia technology, information processing range expanded from text to voice, image, animation, which created very favorable conditions for college English teaching computer applications. With the development of computer networks, remote college English teaching into the actual use of the stage, such as Tsinghua University, Peking University, South China University of Technology, Harbin University of Technology, has been carried out large-scale remote teaching thousands of the number of participants. These new means of college English teaching efficiency is greatly improved: on the one hand, so that more students can get a high level, high-quality university English education; on the
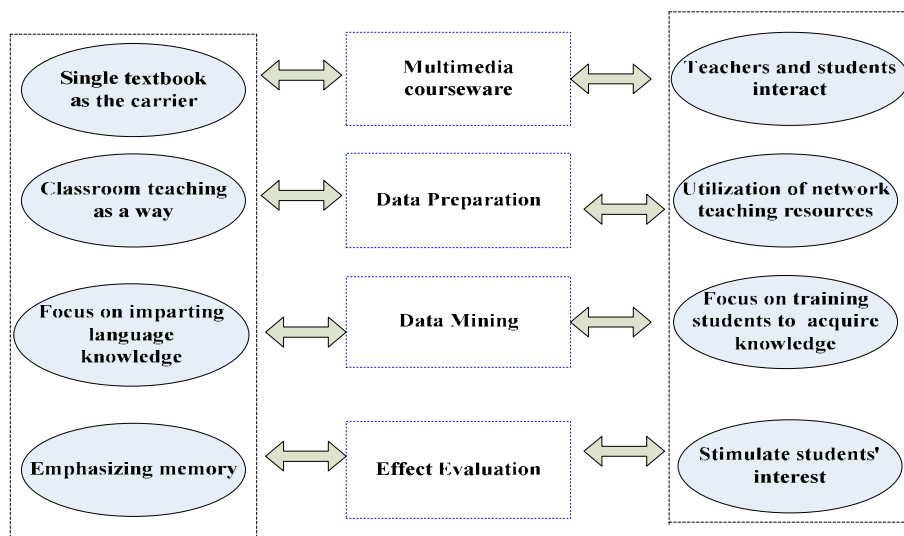
Fig.1: Three different college English teaching

other hand, they can be more fully play the experience of outstanding teachers. For such a large population, a serious shortage of teachers, the level of education is extremely uneven country; the significance of this change is very significant.

Education organization also has been changing. Dozens of students in a classroom, the teacher wrote on the blackboard, students listen to below, this teaching method has gradually changed. With the development of information technology, this uniform, rigid and the neglect of the student's personality has begun to impact. The original seriously hindered the initiative of students, teachers only in accordance with the acceptance of middle-level students lectures, is bound to make good the students have enough to eat and lags behind students widens. This organization has constrained the enthusiasm of teachers and students, making us over the years hoping to form a vivid, lively, active learning atmosphere desire are difficult to achieve. The use of information technology, the school may change this situation, truly individualized. For each student to play to their strengths and compensate for its shortcomings, identify talent, develop creative, vibrant new generation of college students. Hongdan (2011) proposed that information technology teaching college English teaching are inseparable that can significantly improve the quality and efficiency of college English teaching college English teaching new leap. She analyzed the characteristics of the traditional teaching and teaching and their own inadequacies and make some suggestions. The college English is focused on application ability. Teachers should use modern teaching methods and fully mobilize the enthusiasm of the students, so that students can give full play to their potential, not a waste of human resources. Wan Xiaoying (Binhua and Rui, 2001) elaborated the IT classroom teaching characteristics, further pointed out

that the concrete application of information technology in college English classroom teaching methods. The authors (Meiyan, 2010) considered that College English is a very practical course, traditional teaching model is being challenged and modern information technology has been regarded as a new impetus for the existence and development of new century college. Theoretical studies, to increase investment in information technology college English teaching college English reform to strengthen the information age, the traditional concept of the transformation of College English Teachers will be the main task.

The advantage of computer-based multimedia English teaching via text, voice, graphics, images, animation, multimedia information, so that teaching becomes image, vivid and enhance students 'Sensual Delights, improve students' interest in learning; overcome traditional classroom teaching can not guarantee that the students heard that the training time and intensity of defects, so that students can be repeated single language training; teachers teaching language pronunciation differences can be overcome and share high-quality teaching resources; Fourth on the computer network, students English movies, TV English programs and English teaching film and television information can be direct-on-demand learning can also be direct man-machine dialogue, language environment for students to create a consolidate students' knowledge of the language, the language application ability; five students to achieve personalized learning to promote the improvement of students' self-learning ability. Students can select according to their English level and the actual needs of different levels and the level of learning materials, learning at any place, any time, under the guidance of teachers, determine their own learning goals and learning through a self-test feedback effect, identify problems, adjust the learning progress

and learning methods. The Computer+ Classroom teaching system compared to traditional the single classroom teaching mode, the status and role of the teacher, student learning and teaching environment occurred profound changes. From teachers, traditional classroom teaching mode, teachers as the carrier single Textbooks, lectures ways analysis to explain the text focus on teaching instill knowledge of the language, emphasizing memory, the check practice standard answer, based on the achievement of students Juanmian rated; in new English teaching system to interact with teachers and students using textbooks text, multimedia courseware, online teaching resources teaching approach and focus on training students the ability to take the initiative to obtain the knowledge and application of knowledge of the language, as the main form to carry out in order to discuss a variety of the language communicative activities to stimulate the interest of students to apply knowledge of language and assessment of student achievement based on the overall performance of the students teaching links. From students, traditional classroom teaching mode, learning the timing, location, quantitative, mainly by external control classroom to listen, take notes in the form of a passive receiver of knowledge alone learning outside the classroom lectures, concerned about the final learning outcomes (test scores); new English teaching system, students through access to information, search for the use of information, build knowledge and capacity-building, cooperation in the network for interactive learning and focus on reform of the way through the evaluation of the learning process. From the teaching and learning environment, traditional classroom teaching classroom taught by means of Textbooks as a carrier, blackboard, whiteboard, blackboard form of indoctrination Teaching students with less time instant verbal exchanges, mainly in writing exercises lack of real language scenarios and environments; new English teaching system as a way to classrooms, dormitories, stand-alone, multi-media network approach, multimedia, computer networks, Textbooks carrier, can teachers and students instant network intertemporal exchanges realize open teaching students a comprehensive language training mainly context situational rich. Through the above comparison, we can see that the new computer classroom teaching system, while maintaining the advantages of traditional classroom teaching, but also put great emphasis on individualized teaching and self-learning and give full play to the computer can be used alone repeated language training, especially heard about the characteristics of the training, the combination of the teachers classroom lectures and counseling, the students under the guidance of teachers, according to their characteristics, the level of time, choose the right learning content, with the help of computer faster to

improve English comprehensive application capabilities, especially listening and speaking.

The object of this study is to propose hat quality evaluation system and evaluation methods are important and students are made as the main object and multi-level fuzzy comprehensive simplify evaluation model that is suitable for teaching quality of college English is established.

METHODOLOGY

Introduction of data mining technology: Data mining (Data Mining), incomplete, noisy, vague, random data, extract implicit in which people do not know in advance, but potentially useful information and knowledge process extracted knowledge is represented as a concept, rules, patterns, etc. The goal of data mining, artificial intelligence, set theory, statistical methods and apply the appropriate data mining algorithms to analyze data and visualization tools expressed patterns or rules (Ya-Huei *et al*., 2009; Paul *et al*., 2004). Data mining has the following characteristics:

- Can be found to reflect local features and the model of the law
- Automatic trend forecasts, can be found in the knowledge of the "new"
- Relatively easy to get a lot of rules and timely updates. Open way of thinking to the data mining methods in a timely manner, it can draw on and reference to the many achievements of the model law, such as neural networks, rough sets, Naive Bayes algorithm and other methods have been used in the data mining method.

The process of data mining is mining from large databases unknown and effective and can be useful information and use this information to make decisions. It can be divided into four stages of the data preparation, data mining, evaluation stage, as well as the use of stage.

- **Data preparation phase:** Data preparation phase is to eliminate data noise and with the mining theme apparently unrelated data, complete the data filtering, transformation and preprocessing. The processed data is generally stored in a data warehouse. Whether it has done sufficient data preparation will affect the efficiency and accuracy of data mining as well as the validity of the final model. Including:
  o **Data options:** Select the relevant data
  o **Data preprocessing:** To eliminate noise and redundant data
  o **Data speculation:** Missing data projections

o **Data conversion:** The interaction between the discrete value data with continuous value data conversion, the data value of the packet classification, the calculation between the data item combinations

o **The data reduction:** Reducing the amount of data

- **Mining stage:** The stage is the core steps of data mining, is also a technical difficulty. The goal of data mining, artificial intelligence, set theory, statistical methods and apply the appropriate data mining algorithms to analyze data and visualization tools expressed patterns or rules.

- **Evaluation stage:** Data mining model has no real meaning or no value in use and may not accurately reflect the true meaning of the data and therefore needs assessment to determine effective and useful model. Assessment can be based on user-years of experience; some modes can also directly use the data to verify its accuracy. Understand how to dig out the useful knowledge available to the education and management of workers is a very important work; select the appropriate visualization tools, rules to relational tables or quantitative characteristics results to the user.

- **Use of the stage:** Users to understand and that are consistent with the formation of knowledge for practical and valuable mode. Consistency check, to solve the knowledge to be consolidated with the previously obtained knowledge of conflicting, contradictory, but also for knowledge. The use of new knowledge, there are two ways: one is simply to see the relationship or results described by the knowledge itself, can provide support for decision-making; another requires the application of knowledge to analyze the new data, which may produce knowledge need to be further optimized.

Analysis on students' information: Analysis using data mining techniques, such as student's access tracking students' attendance. Analysis, but also the personal circumstances of the student age understand the students' composition, structure and provide the basis for reasonable arrangements for the curriculum. Analysis of the students' examination, combined with the attendance, as examine student learning and provide the basis for a reasonable assessment of the overall quality of students. Rules can be tapped using visualization techniques to teachers in the form of a chart or curve, so that teachers can take full advantage of the resources of the problems of students and to improve the quality of teaching. In addition, data mining can be applied to online examination system, candidates and his achievements made excavation, to help teachers teaching better equip students with the knowledge.

To predict the occurrence of behavior in students and teachers: Associated with the various teaching accident occurred about students and teachers in the teaching, as well as the typical teaching case teaching running information recorded in the management information system using data mining analysis and evolution analysis functions, looking for teachers and students a variety of behavior between intrinsically linked. Such as "when the presence of A, B, C" such a rule can be introduced, i.e., when the behavior of an A and B act, but also have C behavior. In the teaching process, if we find the students or teachers have A, B acts can immediately analyze the possibility to generate C acts timely to develop strategies to promote or suppress C acts occurred.

Evaluation of student learning: Learning Evaluation is one of the important responsibilities of educators. Assessment of student learning behavior, both students play the role of information feedback and stimulate learning motivation, but also a means of checking lesson plans, teaching program as well as teaching purposes, but also to examine students' individual differences and facilitate individualized ways. Performance management database mining, data from performance management database mining task is on a different angle or a different level from the user-specified database mining and a series of statistical results, such as distribution, relationship contrast, significant test, the Extractive results crosstab feature rules, association rules, statistical curves, charts, etc., so the use of statistical analysis method has the advantage of simple, convenient, intuitive and most appropriate. Evaluation of student learning behavior and the overall quality of the commonly used fuzzy comprehensive evaluation and fuzzy clustering methods, fuzzy theory to calculate the comprehensive quality evaluation of qualitative and quantitative indicators weighted average score and ranking on the results of the evaluation and evaluation of the overall quality of students is dynamic, the dynamic clustering method often choose dynamic clustering analysis of the evaluation results.

Evaluation of teaching quality: Teaching evaluation in accordance with the requirements of the educational goals, according to certain rules to make the description and determine the effectiveness of teaching is essential in teaching various aspects. Teaching evaluation through the campus network to collect students taught by classroom teachers, views, evaluation of the counseling sessions. Views on student discussion, students scoring evaluation, usually various teaching examination, the appropriate course final exam class results aggregated content are teaching evaluation, these data as the course teacher Professor corresponding file all the data stored in the database. Data mining analysis about the teaching evaluation database processing the teaching content teachers can determine the scope and depth of suitability; selected instructional media are appropriate to the selected

teaching contents and objects; explain the time is just right; teaching strategies properly, etc.. Mining rules timely feedback to teachers, in order to better improve the teaching level, to better serve the students.

RESULTS AND EVALUATIONS

Fuzzy integrated evaluation: Fuzzy mathematics is the use of mathematical methods of research and a new science dealing with ambiguity phenomenon. Fuzzy set theory provides a way to handle uncertainty and imprecision problem new method, a powerful tool for the description of the human brain thinking today. In recent years, this technology is not only widely used in automatic control, computer and information processing, data statistical analysis and many other natural sciences and used in decision-making, education, teaching, management and social sciences. More related to fuzzy measure, fuzzy recognition, fuzzy reasoning, fuzzy sets, fuzzy search, fuzzy optimization, fuzzy control and fuzzy decision-making and other aspects. The evaluation findings are fuzzy, making conclusions more precise, especially suitable for the English classroom teaching evaluation under the new concept of the subjective or qualitative indicators comprehensive evaluation (Armen, 2007; Weiping, 2007; Chuansheng, 2009). Classroom teaching evaluation feedback allows teachers to keep abreast of the requirements of their own teaching situation and students found the problems and shortcomings in the teaching, weaknesses, abilities and efforts to improve the level of their own teaching, teaching objectives. On the other hand, it can make the school leadership, teaching management departments and faculties to make an objective analysis of the teachers teaching situation, favorable hand to raise the scientific level of the faculty building and discover talents. Therefore, the class multi-level fuzzy comprehensive simplify the evaluation has a direct role in promoting scientific management to promote the teaching reform and improve the teaching level, promotion of teachers.

Results analysis of information technology system:

Case 1: Table 1 classroom teaching evaluation system", we have adopted a multi-level fuzzy comprehensive evaluation method, the re-evaluation of the teacher's classroom teaching quality from the original rights of the four factors. First of all, as an evaluation of each indicator target, as they contain two indicators index set.

- **The evaluation of teaching attitude:**

Step 1: The index set clear teaching attitude evaluation objectives:

$$U_1 = (u_{11}, u_{12}, u_{13}, u_{14})$$

Step 2: A clear review sets:

$$V = (v_1, v_2, v_3, v_4, V_5);$$

where,

V_1 = excellent, V_2 = Orleans, V_3 =, V_4 poor, V_5 = Poor

Step 3: The weight vector W_1 of the explicit mapping of:

$$U_1 = (W_{11}, W_{12}, W_{13}, W_{14}) = (0.25, 0.25, 0.25, 0.25)$$

Step 4: If, statistics and calculated based on the measured out following a particular teacher evaluation in Fig. 2.

Step 5: Calculate the fuzzy comprehensive evaluation matrix (Rank vector): $B_1 = W_1 * R_1 = (0.3959\ 0.4063\ 0.1615\ 0.0261\ 0.0104)$ noted that max $\{0.3959\ 0.4063\ 0.1615\ 0.0261\ 0.0104\}$ = 0.4063, so the maximum membership principle, the attitude of the teacher's teaching "good"; further analysis also found that the attitude of the teachers teaching with "excellent" is also very close to membership of 0.3959.

Table 1: English classroom teaching evaluation index system

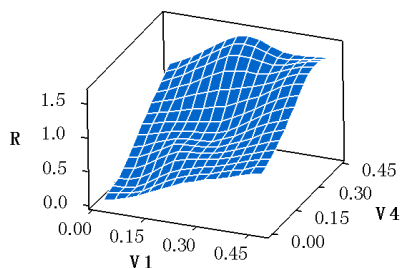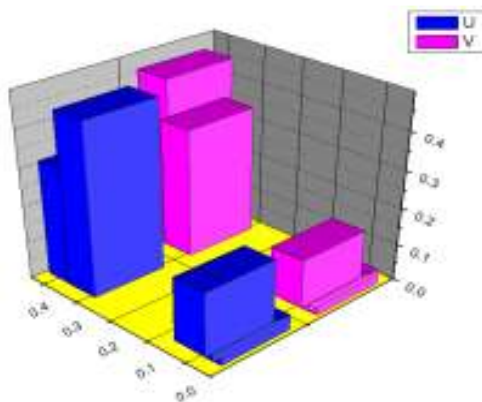| Level indicators	Secondary indicators	1-5 point
The teaching attitude (20 points)	1. Teaching, care for students, for all students, pay attention to individualized	
	2. Seriously organize teaching, attention to classroom discipline, clear and specific teaching objectives	
	3. Courseware graphic animation and Mao, classroom informative, passionate lectures	
	4. Can give students thinking Lenovo inspiration, attention to students' questions	
The teaching content (15 points)	1. Fully prepare lessons, familiar with the teaching content, cultural background, heavy foundation and re-application	
	2. Focused and difficult to grasp properly, clear thinking, structured	
	3. Absorb new ideas, new achievements, new technologies, update teaching content	
The teaching methods(20 points)	1. Theory with practical emphasis on language practice application link classroom experience	
	2. Can use English organization teaching English Teaching Spoken accurate, vivid, fluent reading	
	3. Teachers' attitudes and generous, influential, teacher-student exchanges natural harmony	
	4. Classroom structure is tight, compact, good interaction between teachers and students	
The teaching Effect (15 points)	1. Mobilize the enthusiasm of students, to stimulate the thinking of students in the classroom, and interest in learning	
	2. Enable students to master the learning method to improve the ability of self-learning and innovation	
	3.Students can master and apply the lesson learned	

Fig. 2: The evaluation effect of teaching attitude

Fig. 3: Evaluation of teaching effect
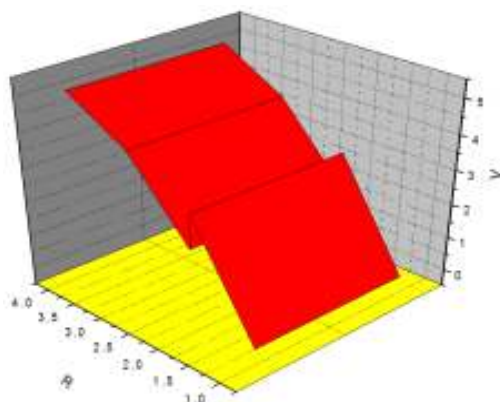
Fig. 4: Representation of weight vector

Table 2: Evaluation of the teaching content

R_1	V_1	V_2	V_3	V_4	V_5
u_{21}	0.47	0.2501	0.2084	0.0418	0.0207
u_{22}	0.34	0.5624	0.1251	0.0001	0.0209
u_{23}	0.37	0.3751	0.1459	0.0207	0.0001

Table 3: Evaluation of teaching methods

R_1	V_1	V_2	V_3	V_4	V_5
u_{31}	0.53	0.28	0.18	0.03	0.02
u_{32}	0.47	0.45	0.03	0.05	0.01
u_{33}	0.39	0.41	0.18	0.03	0.01
u_{34}	0.40	0.39	0.16	0.01	0.05

- **Evaluation of the teaching content:** Target index set $U_2 = (u_{21}, u_{22}, u_{23})$; assessment language set V unchanged; establish evaluation in Table 2:

Take weight vector $W_2 = (w_{21}, w_{22}, w_{23}) = (0.334, 0.333, 0.333)$ evaluation level vector: $B_2 = W_2 * R_2 = (0.3901\ 0.4600\ 0.1199\ 0.0200\ 0.0133)$; maximum membership principle, the teacher teaching content reviews as "good"; further analysis shows that the teacher's teaching content review "excellent" is also very close to.

- **Evaluation of teaching methods:** Target indicators set $U_3 = (u_{31}, u_{32}, u_{33})$; the assessment language set V unchanged; establish evaluation Table 3:

The take weight vector $W3 = (w_{31}, w_{32}, w_{33}, w_{34}) = (0.25, 0.25, 0.25, 0.25)$, evaluation of the level of vector: $B_3 = W_3 * R_3 = (0.4450\ 0.3775\ 0.1325\ 0.0250\ 0.0250)$;

Maximum membership principle, the teacher's teaching methods as "excellent".

- **Evaluation of teaching effect:** Target index set $U_3 = (U_{41}, U_{42}, U_{43})$; assessment language set V constant; Evaluation effect is shown in Fig. 3.

Take $W_4 = (w_{41}, w_{42}, w_{43}) = (0.334, 0.333, 0.333)$, evaluation of the level of vector: $B_4 = W_4 * R_4 = (0.3967\ 0.4034\ 0.1266\ 0.0334\ 0.0400)$;

Maximum membership principle, the effect of the teacher's teaching "good"; further analysis also found that the teacher's teaching content and "excellent" is also very close to membership 0.3967.

Improvement on eigenvector of fuzzy integrated evaluation: The foregoing analysis shows that the comprehensive evaluation method, the weights assigned crucial, directly affect the results of the evaluation, we seize the major part of which ignore the secondary part, simplify the evaluation index, simplified, improved determination of fuzzy comprehensive evaluation weight vector method steps, the first step is still class hierarchy model, such as "Table 1" as the establishment of the assessment objectives; second step, the Analytic Hierarchy Process (Analytic Hierarchy Process) to determine the weight vector of factors pairwise comparison judgment matrix carving factor in the degree of importance scale value as 18: 1, 2, ..., 9 and its countdown. Various indicators with large fuzzy complexity Zadeh Professor grams principle: "When the rising complexity of the system, we make the system features accurate assessment of the teaching but meaningful description capacity will be reduced accordingly, until it reaches a threshold value and once over it, accuracy will become meaningful and two almost mutually exclusive properties. "- That is, the higher the degree of complexity, meaningful precise ability will be lower. So for the assessment of teaching, this study simplifies characterize the scale value of the indicators of the degree of importance, from 18 kinds to three kinds. The simplified method of the second step, the scaled value is only taken: 0, 1 and 2 and provides the following scale method. By comparison matrix of acceptances of the Analytic Hierarchy Process

simplifies weight calculations and determined to become very clear and concise. Here to the determination of the corresponding weight vector W with a five evaluation (I, II, III, IV, V), for example and press on the table the meaning of the value of the scale, shown in Fig. 4. This is an evaluation of I, II, III, IV, V right weight vector: W = (0.20, 0.24, 0.16, 0.16, 0.24).

CONCLUSION

In short, with the sharp increase of the amount of information and the higher requirements of information extraction, is difficult to follow the traditional method in the massive amounts of data to find the basis of decision-making, this requires the help of data mining to discover hidden regularity or pattern in the data, to provide more effective support for decision-making. Although data mining as a tool, it is always not a substitute for the status of teachers, but it can provide a scientific basis for teachers' decisions. The data mining technology itself is the crystallization of people a lot of practice, it provides a shortcut to establish the traditional model difficult to obtain or impossible to obtain teaching. In this study, a comprehensive evaluation method of fuzzy mathematics quantitative calculation, analysis instance through specific English classroom testing proved that the method is objective, valid, scientific and feasible. The evaluation index weight of established methods, but also promotes the application to other areas and has some practical significance.

REFERENCES

Armen, D.K., 2007. Availability, reliability and downtime of systems with repairable components. Reliab. Eng. Syst. Safety, 91(2): 231-242.

Binhua, W. and L. Rui, 2001. A report on the instructional effect of CAI courseware. Comput. Assist. Foreign Lang. Educ. China, 80: 42-45.

Chuansheng, W., 2009. Teaching quality assessment: A model of fuzzy mathematics. J. Capital Univ., Econ. Bus., 2: 119-122.

Feibeng, L., 2006. Improving college English teaching by using data mining. Comput. Assist. Foreign Lang. Educ. China, 111(5): 72-74.

Hongdan, Z., 2011. Study on college English information technology teaching. Overseas English, 12: 124-125.

Meiyan, L., 2010. Application of information technology in college English teaching reform. Proceeding of the 2010 International Conference on Artificial Intelligence and Education (ICAIE), pp: 81-84.

Paul, H., B. Alan and W. Michael, 2004. Fungal gene sequences make excellent models for teaching data mining. Mycologist, 18(3): 118-124.

Weiping, H., 2007. On evaluation indicator system of college English teaching. J. Guangxi Univ., Nat. Phil. Soc. Sci. Edn., 3(2): 189-191.

Ya-Huei, W., T. Ming-Hseng and L. Hung-Chang, 2009. Data mining for adaptive learning sequence in English language instruction. Expert Syst. Appl., 36(4): 7681-7686.

Yanli, L., 2010. On college English autonomous learning based on internet and multimedia. Proceeding of the 2010 International Conference on Multimedia Technology (ICMT), pp: 1-3.