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Research Article

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Analysis of results of CET 4 & CET 6 Based on AHP

[1*]Guanchen Zhou, [2]Dongying Yang and [3]Yingna Zhao

[1]Qinggong College, Hebei United University, Tangshan, China
[2]College of Foreign Languages, Hebei United University, Tangshan, China
[3]Hebei United University, Tangshan, China

ABSTRACT

Based on the results of CET 4 and CET 6, a model has been established in this paper to analyze the English teaching and CET 4 and CET 6. The analytic hierarchy process has been adopted to implement the quantitative analysis, and then the clear and convincing conclusion has been obtained. After the hierarchical the results of CET 4 and CET 6, we establish the model in which we have found that the old exams have the greatest influence on the results. After the analysis of CET scores based on the average random consistency index data, the effective CET reasonable proposals to improve students' performances have been raised. Because after the reform the English practical ability has become the focus of the exams, the pass rate of students who haven't passed the exams has been predicted on the basis of the current candidate's ability.

Keywords: CET 4 and CET 6; analytic hierarchy process; data analysis; Matlab

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INTRODUCTION

During today's job interviews, CET certificates have often been used by the employers to measure the individual ability and your hardworking degree. Each year the lack of CET certificates may lead to 31.6% interviewees' failure[1]. Therefore, the improvement in their English is necessary. In addition, on August 14, 2013, the National CET Band Commission announced the structural reform on CET 4 and CET 6 papers. Cloze has been canceled; translation ratio has been significantly increased; the compound dictation of the listening part has been turned into words and phrases dictation; the matching questions of the reading comprehension have been added; 10 more minutes have been added on the basis of the original 120 minutes, which is now 130 minutes.

Through the research and analysis of the results of CET, we build the model to provide the reasonable proposals to the English teaching and the college students for their preparation for CET. Because after the reform the English practical ability has become the focus of the exams, the pass rate of students who haven't passed the exams has been predicted on the basis of the current candidate's ability. We establish a mathematical model of CET scores for college students and use AHP to implement the quantitative analysis to draw clear and convincing conclusion[2]. Then the hierarchical CET problems can be got. The top layer (Target Layer) is increasing CET scores; the middle layer (Guidelines Layer) includes writing, listening, reading, and translation; the bottom layer (Plan Layer) includes doing the old test papers, watching foreign movies, reading English magazines, communication with foreigners, and listening to English songs.

Average random consistency index

n	1	2	3	4	5	6	7	8	9
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45

After the establishment of the judgment matrix of the hierarchical model based on the data analysis, the eigenvalues can be obtained. The consistency index is calculated to determine the consistency. The weights of the affecting

factors have been got. We analyze the CET scores based on the average random consistency index data, obtaining the portfolio weights of the affecting factors. After the analysis of the result, the reasonable proposals to effectively improving the CET results.

When forecasting the pass rate of the students who failed in the past exams, we firstly classify the results of the latest CET 4 and CET 6, getting the overall average scores and the average scores of each part of the tests. Then the failing rates of CET 4 and CET 6 are obtained. We analyze the most students' performances in each part and compare the changes of difficulty factor before and after the reform, and then we come to the changes of pass rate.

Analytic Hierarchy Process (AHP)

The layers in the structure of AHP reflect the relation of each factor. Saaty proposed that we could use 1-9 and their reciprocals as the scale to represent the importance. The scaling method can be shown in Table 1.

Table 1 Table of judgment matrix and its meaning

Scales	Meaning
1	When two factors compare with each other, they have equal importance.
3	When two factors compare with each other, the former is little more important than the latter.
5	When two factors compare with each other, the former is obviously important than the latter.
7	When two factors compare with each other, the former is greatly important than the latter.
9	When two factors compare with each other, the former is extremely important than the latter.
2,4,6,8	They represent the middle values of the neighboring judgments.
Reciprocals	If the ratio of factor x_i and factor y_i to z is a_{ij}, the ratio is $a_{ji} = 1/a_{ij}$.

According to the above influencing factors, we establish the hierarchical model of the result standards for CET 4 and CET 6, which is shown in Fig. 1.

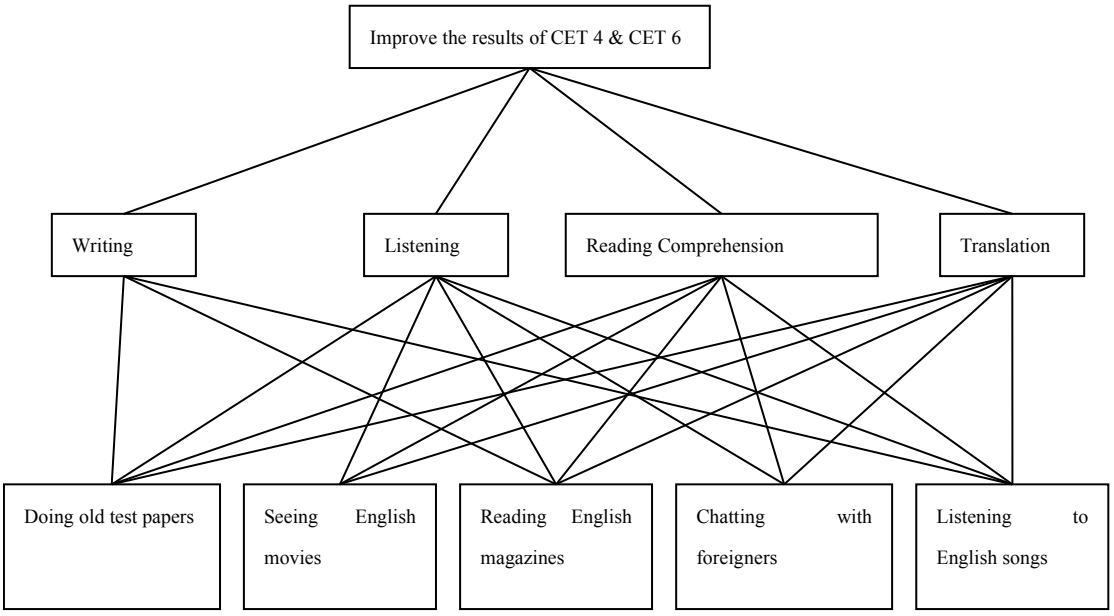

Fig. 1 Hierarchical structure of the result standards for CET 4 and CET 6

According to the experts' assessments, the pairwise comparison matrix of CET result evaluation layer structure model referring to the national excellent course system, which is shown in Table 3-7.

Table 3 A-B

A	B1	B2	B3	B4
B1	1	3/7	3/7	1
B2	7/3	1	1	7/3
B3	7/3	1	1	7/3
B4	1	3/7	3/7	1

Table 4 B1-C

B1	C1	C3	C4	C5
C1	1	3	5	4
C3	1/3	1	5/3	3/4
C4	1/5	3/5	1	4/5
C5	1/4	3/4	5/4	1

Table 5 B2-C

B2	C1	C2	C3	C4	C5
C1	1	1	5	2	4
C2	1	1	5	2	4
C3	1/5	1/5	1	2/5	4/5
C4	1/2	1/2	5/2	1	2
C5	1/4	1/4	5/4	1/2	1

Table 6 B3-C

B3	C1	C2	C3	C4	C5
C1	1	3	2	6	4
C2	1/3	1	2/3	2	4/3
C3	1/	3/2	1	3	2
C4	1/6	1/2	1/3	1	2/3
C5	1/4	3/4	1/2	3/2	1

Table 7 B4-C

B4	C1	C2	C3	C4	C5
C1	1	4	2	5	4
C2	1/4	1	1/2	5/4	1
C3	1/2	2	1	5/2	2
C4	1/5	4/5	2/5	1	4/5
C5	1/4	1	1/2	5/4	1

We calculate the maximum eigenvalue and the eigenvector of the judgment matrix and test the consistency of it.

$$CI = \frac{\lambda_{\max} - n}{n-1} \tag{2}$$

The corresponding average random consistency index is RI and calculates the consistency proportion which is CR.

$$CR = \frac{CI}{RI} \tag{3}$$

When CR<0.10, we regard that the pairwise comparison matrix is accepted, otherwise, the matrix should be revised.

When CI=0, the counter matrixes are consistent matrixes. We have got the order and the characteristic roots and the results can satisfy the theorem. We know CI=0. So we don't need to adjust the pairwise comparison matrix.

As to the weight vector, some people including Saaty suggest that we should use the eigenvector (after the normalization) of the maximum characteristic root $\lambda_{\max}$ of A as the weight vector w, and w should satisfy

$$Aw = \lambda w \tag{5}$$

We should use matlab to calculate the maximum eigenvalue $\lambda_{\max}$ of each matrix, CI and the eigenvector after the normalization. The result is shown in Table 8.

Table 8 The eigenvalue of the judgment matrix

Judgment Matrix	Weight Vector W	Maximum Eigenvalue	CI	RI	CR
A-B	(0.1500, 0.3500, 0.3500, 0.1500)	4	0	0.9	0
B1-C	(0.5732, 0.1688, 0.1146, 0.1433)	3.9	-0.0375	0.9	-0.0417
B2-C	(0.3390,0.3390,0.0678,0.1695, 0.0847)	5	0	1.12	0
B3-C	(0.4444,0.1481,0.2222,0.0741,0.1111)	5	4.4409e-16	1.12	03.9651e-16
B4-C	(0.4545,0.1136,0.2273,0.0909,0.1136)	5	0	1.12	0

According to Table 8, the values of the portfolio weights of C1-C5 can be calculated which are shown in Table 9.

Table 9 The values of portfolio weights

Layer	B1 0.15	B2 0.35	B3 0.35	B4 0.15	Weights
C1	0.5732	0.339	0.4444	0.4545	0.428345
C2	0	0.339	0.1481	0.1136	0.187525
C3	0.1688	0.0678	0.2222	0.2273	0.160915
C4	0.1146	0.1695	0.0741	0.0909	0.116085
C5	0.1433	0.0847	0.1111	0.1136	0.107065

From the above table, we can get C1=0.428345, which represents that the influential ratio of doing the old test papers to the CET result is 0.428345. And the impacts rank list of all the influential factors is doing old test papers > seeing English movies > reading English magazines > chatting with foreigners > listening to English songs. So from the ranking list, we can get that doing the old test papers has the greatest impact and others have less impacts.

Reasonable suggestions

From the conclusion of AHP, the college students should devote themselves to do the old test papers of CET 4 & CET 6, through which they can remember words, improve the speed of doing test papers and the correct rate and master the assignment of the test by the experts. Besides, the students should also see more English movies and TV series so as to exercise listening skills and master the usage of the words and phrases[3]. During the spare time, the students may read some English magazines, chat with the foreigners and listen to English songs. In this way, the students can know the foreign cultures, spread the Chinese civilization, edify the sentiment and improve the writing, listening and speaking, reading comprehension and translation ability.

Analysis of the data

1)We implement the statistics and subtotals of the latest results of CET 4 and CET 6 and get the following table.

Table 10 The average of CET 4 result

Classification	Total Score	Score of Listening	Score of Reading Comprehension	Score of Writing	Score of Composite	Number of People Attended
＜425	368.5	119.1	135.5	75.0	38.9	4585
（425,450）	435.4	140.3	162.1	89.3	43.8	515
≥450	471.6	153.8	174.0	97.6	46.1	290

Table 11 The average of CET 6 result

Classification	Total Score	Score of Listening	Score of Reading Comprehension	Score of Writing	Score of Composite	Number of People Attended
＜425	345.7	107.1	140.0	67.3	31.3	1601
（425,450）	435.0	136.7	177.4	82.8	38.1	57
≥450	475.3	153.5	189.3	90.8	41.7	61

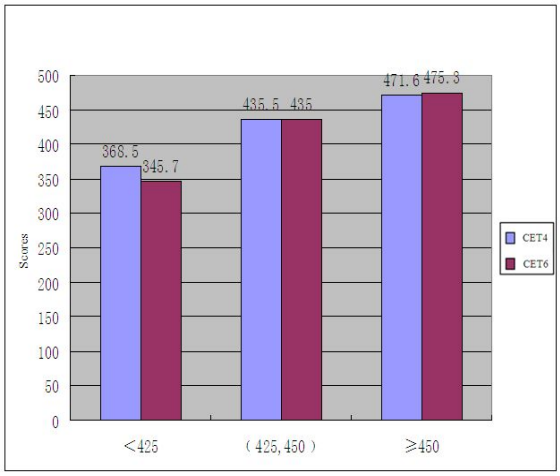

Fig. 2 Average Scores of CET 4 & CET 6

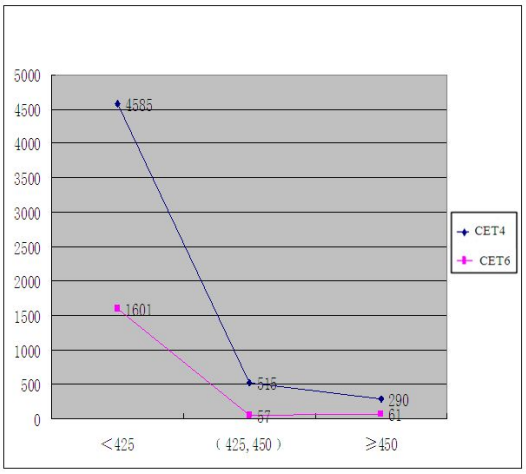

Fig. 3 Number of People Attending CET 4 & CET 6

From the above figures, we can know that the 85% students failing in CET 4 and 93% students failing in CET 6, which shows that the English proficiency of college students should be greatly improved.

2)Because the scores which the passing students have range from 425 to 450, we make a detailed analysis of each part. The result is as follows,

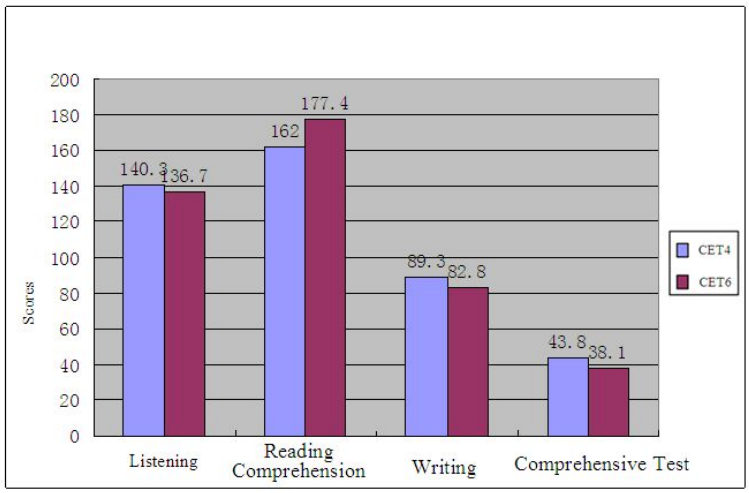

Fig.4 Average scores of each part in CET 4 & CET 6(425-450)

From the above figure, the scores of reading comprehension and listening occupy a large amount in the passing students' scores. The average scores of all the parts in the exam of the passing students are including listening: about 140, reading comprehension: about 170, writing: about 90 and composite: about 40.

3)After the reform, the score of writing occupies 15%; listening occupies 35%; reading comprehension occupies 35%, and translation occupies 15%. The overall difficulty doesn't change. But the difficulties of all the parts change differently. The compound dictation of listening has been replaced by the dictation of words and phrases, which becomes easier comparatively[4]. The fast reading has been changed into matching questions, which requires the new language ability of logic analysis, reasoning, and development. The proportion the translation has been intensified. The proportion of subjective questions has been increased from 20% to 30%. It needs higher English application capability and comprehensive capability.

Table 12 Difficulty factor of each part of CET 4 and CET 6

Category	Writing	Listening		Reading Comprehension	Translation
		Choice Selection	Compound		
Before Reform	0.82	0.85	0.97	0.75	0.89
After Reform	0.83	0.78	0.72	0.90	0.95

According to the above table, we analyze and arrange the data and get the change factors (the ratio of difficulty factor before reform to that after the reform) of each part. Because the listening part is divided into 2 sections, we treat its change factors as follows,

$$a_{21} = \frac{0.85}{0.78} \approx 1.0897\,,\quad a_{22} = \frac{0.97}{0.72} \approx 1.3472 \tag{6}$$

$$\text{Change factor}\quad a_2 = \frac{0.85}{0.85+0.97} \times 1.0897 + \frac{0.97}{0.85+0.97} \times 1.3472 \approx 1.2269 \tag{7}$$

In this way, the change factors of each part can be got as below,

Table 13 The change factors of each parts

Parts	Writing	Listening	Reading Comprehension	Translation
Change Factors	0.9880	1.2269	0.8333	0.9368

According to the obtained change factors, we calculate the results of the failed students once again and get the results. After the reform, 65 original failed students in CET 4 might pass the exam, which occupies 1.418%; 11 original failed students in CET 6 might pass the exam, which occupies 0.687%.

Therefore, the reform may help some students pass the exams. And it also can improve the English application capability and comprehensive capability, which can benefit the students in their future jobs and can improve the employment rate.

CONCLUSION

CET 4 and CET6 can accelerate the standardization process of college English teaching content and training content, and can develop the directive function of exams. Secondly, CET 4 and CET6 provide a target level for the college English teaching overall teaching, which can push the teachers to put more attention to the adjustment of the teaching methods and the teaching focuses. Thirdly, the exams can stimulate the teaching and learning. The results of CET 4 and CET 6 are the authority and some colleges and universities use the results to evaluate the teaching quality, which can motivate the enthusiasm of the teachers and students, improve the status of college English among all the courses and promote the development of college English reform.

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