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## Discussion on the advantages and disadvantages of the CET examination on college students' English level on the basis of the fuzzy evaluation model

Qilun Cai

School of Foreign Languages, Handan College, Handan 056005, Hebei, (CHINA)

E-mail : qilunca\_i\_2014@yeah.net

### ABSTRACT

Based on the CET examination results of the college students of previous sessions, this paper applied the theory of fuzzy nearness, discussed the fuzziness of the factors influencing college students' English level, had a quantitative analysis on the interrelation between the English level and its influencing factors, cleared the relationship between the CET-4 and CET-6 examinations and the English level of the contemporary college students. This paper is of guiding significance on English teaching and learning.

### KEYWORDS

English level; Fuzziness; Analysis method; CET.



## INTRODUCTION

As a language, the English teaching and learning requires to integrate looking, listening, reading, writing, and remembering. Therefore, in order to improve the level of English teaching or learning, the contents of the current CET examination for the non-English majors include: listening, reading, writing and comprehensive test.

According to my previous research results, the roles of the above factors in improving the teaching level or learning efficiency are different, that's to say, some factors are the major ones in influencing the English level, while others influenced slightly. Finding the major influencing factors and then focusing on the cultivation and improvement of these factors will help the students get twofold results with half the effort.

This paper introduced the theory of fuzzy nearness in the fuzzy mathematics into the study of this problem and tried to find another way solution to this problem. The practice showed that the expectation is basically achieved.

### THE FUZZINESS OF THE FACTORS INFLUENCING THE ENGLISH LEVEL

As a tool of exchanging, communication and contacting for human in the social activities of production, living, etc., Language is the basic condition for promoting the development of the human society. Language and the social development supplement and boost each other. Due to the asymptotic property of the development of the social productive forces, language was increasingly developed, completed and enriched. As for an individual, the mastery and application of a language in a certain period is inadequate as it needs to be accumulated for a long term. Taking the English teaching or learning for instance, in order to measure their levels and effects, we are prone to measure the reached English level, the mastered English words and application ability, as well as the English expression through the individual score or the total scores in listening, reading, writing and comprehensive test. This kind of method is a relatively simple and quantitative criterion, because there is no clear boundary between "good and bad" and "more and less", instead, it is of fuzziness. Good performance indicates higher English level, otherwise indicates lower level, which means that the aggregative indicators reflecting the English level, such as the total scores, or the sub-indicators, such as listening, reading, translation and writing are of objective fuzziness. Therefore, if we set  $U$  as limited domain,  $U = (x_1, x_2, x_i, \dots, x_n)$ , among which  $x_i \in U$  means the  $i^{\text{th}}$  English teacher and learner, so the English level ( $A$ ) and its influencing factors, such as listening ( $B_1$ ), reading ( $B_2$ ), writing ( $B_3$ ), comprehensive test ( $B_4$ ) are the four fuzzy subsets on  $U$ , and  $\mu_A(x_i), \mu_{B_j}(x_i) (i=1,2,\dots,n, j=1,2,\dots,6)$  are the degrees of membership of  $A$  and  $B_j$  respectively.

### THE METHODS FOR MEASURING THE SIMILARITIES BETWEEN FUZZY SETS

The degree of similarities between two fuzzy sets can be obtained by measuring the fuzzy distance or approach degree between them, the former reflects the difference degree between them and the later reflects the approach degree between them. Set  $A, B (j=1,2,3,4)$  as the four fuzzy subsets on the limited domain  $U$ ,  $x_i \in U$ ,  $\mu_A(x_i), \mu_{B_j}(x_i)$  are the degrees of membership of  $A$  and  $B_j$  respectively, so as to take the Hamming distance and approach degree for instance to obtain the Hamming absolute distance:

$$d(A, B_j) = \begin{cases} \int_{-\infty}^{+\infty} |\mu_A(x_i) - \mu_{B_j}(x_i)| dx \dots \dots \mu = (-\infty, +\infty) \\ \int_{\alpha}^{\beta} |\mu_A(x_i) - \mu_{B_j}(x_i)| dx \dots \dots \mu = [\alpha, \beta] \\ \sum_{i=1}^{\mu} |\mu_A(x_i) - \mu_{B_j}(x_i)| dx \dots \dots \text{其它} \end{cases}$$

Hamming relative distance:

$$\delta(A, B_j) = \begin{cases} \frac{1}{\beta - \alpha} \int_{\alpha}^{\beta} |\mu_A(x_i) - \mu_{B_j}(x_i)| dx \dots \dots \mu = [\alpha, \beta] \\ \frac{1}{n} \sum_{i=1}^{\mu} |\mu_A(x_i) - \mu_{B_j}(x_i)| dx \dots \dots \text{其它} \end{cases}$$

Hamming approach degree

$$N_H(A, B_j) = 1 - \delta(A, B_j) \dots \dots (1)$$

### ANALYTICAL CALCULATION ON THE INFLUENCING FACTORS OF ENGLISH LEVEL

In order to find out the major influencing factors of English teaching and learning performance, the following contents aim to analyze and calculate the major and secondary influencing factors of English level by measuring the similarities between the fuzzy sets as stated above.

#### Determine the degree of membership

Fuzziness is described by the degree of membership, which is the quantity index reflecting the uncertainty between elements and membership of the sets, and is able to reflect the objective possibility between elements and the membership of sets. Degree of membership is a kind of objective description of fuzziness.

The ways to determine the membership function include: fuzzy statistical test method, function sectioning method, binary comparison and sorting, etc. Based on the CET examination results of the college students of previous sessions (refer to TABLE 1), this paper set the formula of the degree of membership by means of reasoning. Set  $U = (x_1, x_2, x_i, \dots, x_n)$  as the domain of the CET examination results of the college students of previous sessions,  $x_i$  is the total scores of the  $i^{th}$  college student,  $x_i \in U$ ;  $x_{ij}$  is the  $j^{th}$  individual score of the  $i^{th}$  college student, among which,  $j = 1, 2, \dots, 4$  refers to listening, reading, writing and comprehensive test respectively,  $x_{ij} \in U$ . Set the degree of membership of  $x_i$  is  $\mu_A(x_i)$  in the member of fuzzy subset A, and the degree of membership of  $x_{ij}$  is  $\mu_{B_j}(x_{ij})$  in the member of  $B_j (j = 1, 2, \dots, 4)$ . The formula is

$$\left. \begin{aligned} \mu_A(x_i) &= \frac{x_i}{x_{i\max}} \\ \mu_{B_j}(x_{ij}) &= \frac{x_{ij}}{x_{ij\max}} \end{aligned} \right\} \quad (2)$$

Among which,  $x_{i_{\max}}$  is the maximum value of  $x_i (i = 1, 2, \dots, n)$ , and  $x_{ij_{\max}}$  is the maximum value of  $x_{ij} (i = 1, 2, \dots, n; j = 1, 2, \dots, 6)$ .

**Approach degree calculation**

Based on TABLE 2, the approach degree between the listening, reading, writing, comprehensive and the total scores are 0.915, 0.945, 0.908 and 0.919 respectively by means of formula (1). It is hereby obtained that the four influencing degree of the four factors on English level are: reading>comprehensive test>listening>writing.

**TABLE 1 : Test Data Sheet**

Domain u	Total Score A	Listening B1	Reading B2	Writing B3	Comprehensive Test B4
x1	530	195	189	93	53
x2	490	169	175	86	60
x3	482	174	166	89	53
x4	479	157	181	91	50
x5	479	169	175	91	44
x6	476	152	169	110	45
x7	468	171	166	82	49
x8	465	149	182	84	50
x9	460	130	184	93	53
x10	457	135	183	91	48
x11	455	147	181	79	48
x12	453	171	143	93	46
x13	451	166	132	110	43
x14	451	130	179	89	53
x15	451	162	170	89	30
x16	450	149	154	96	51
x17	449	164	176	65	44
x18	449	157	156	96	40
x19	447	145	151	108	43
x20	445	125	186	84	50
x21	439	159	125	115	40
x22	439	154	169	65	51
x23	438	157	147	98	36
x24	436	130	157	96	53
x25	435	113	183	84	55
x26	435	166	129	96	44
x27	434	130	157	89	58
x28	433	140	145	98	50
x29	432	121	181	84	46
x30	430	152	134	100	44
x31	430	140	156	84	50
x32	429	152	126	98	53
x33	429	154	153	84	38
x34	429	135	152	89	53
x35	428	145	159	86	38
x36	422	147	143	93	39
x37	421	125	149	98	49
x38	419	128	168	79	44

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x39	418	135	156	84	43
x40	412	137	151	86	38
x41	411	142	127	91	51
x42	410	137	159	77	37
x43	409	128	162	77	42
x44	409	142	147	70	50
x45	407	123	164	72	48
x46	406	123	154	84	45
x47	405	121	168	58	58
x48	400	113	157	84	46
x49	399	121	151	86	41
x50	398	140	143	79	36
x51	397	133	134	77	53
x52	395	104	154	91	46
x53	395	128	136	86	45
x54	395	121	156	72	46
x55	394	133	122	96	43
x56	393	128	135	82	48
x57	392	121	145	86	40
x58	389	111	136	96	46
x59	388	135	125	86	42
x60	384	128	135	86	35
x61	383	108	143	93	39
x62	382	113	137	84	48
x63	378	137	126	77	38
x64	377	130	139	67	41
x65	374	111	130	93	40
x66	372	135	127	70	40
x67	371	106	164	65	36
x68	369	86	149	84	50
x69	367	128	130	72	37
x70	365	106	158	72	29
x71	364	140	132	51	41
x72	363	118	136	67	42
x73	362	135	125	63	39
x74	360	128	127	67	38
x75	359	125	127	70	37
x76	357	125	122	72	38
x77	356	116	138	58	44
x78	354	94	143	72	45
x79	352	108	123	86	35
x80	351	108	121	77	45
x81	350	104	127	84	35
x82	349	118	127	65	39
x83	346	116	128	67	35
x84	345	116	130	56	43
x85	345	133	126	60	26
x86	344	121	132	65	26
x87	344	116	127	58	43
x88	341	116	120	67	38

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x89	340	101	138	58	43
x90	339	123	124	51	41
x91	336	116	128	56	36
x92	335	113	132	56	34
x93	334	108	114	72	40
x94	332	121	99	79	33
x95	328	101	128	65	34
x96	328	113	140	46	29
x97	323	96	125	67	35
x98	311	92	121	63	35
x99	307	123	139	0	45
x100	303	101	107	65	30

TABLE 2 : calculation results of the degree of membership

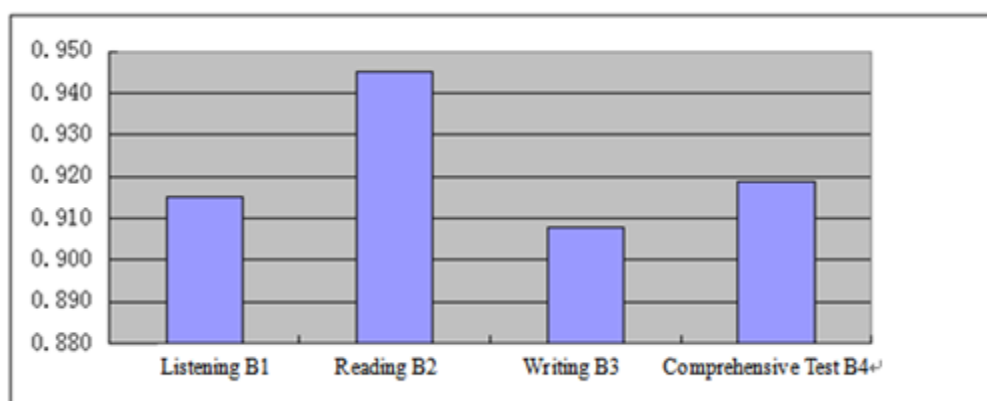
<i>Domain u</i>	<i>Total Score A</i>	<i>Listening B1</i>	<i>Reading B2</i>	<i>Writing B3</i>	<i>Comprehensive Test B4</i>
x1	1.000	0.000	0.000	0.191	0.117
x2	0.925	0.058	0.001	0.177	0.075
x3	0.909	0.017	0.031	0.136	0.026
x4	0.904	0.099	0.054	0.112	0.070
x5	0.904	0.037	0.022	0.112	0.170
x6	0.898	0.119	0.004	0.058	0.148
x7	0.883	0.006	0.005	0.170	0.066
x8	0.877	0.113	0.086	0.147	0.044
x9	0.868	0.201	0.106	0.059	0.015
x10	0.862	0.170	0.106	0.071	0.062
x11	0.858	0.105	0.099	0.172	0.058
x12	0.855	0.022	0.098	0.046	0.088
x13	0.851	0.000	0.153	0.106	0.134
x14	0.851	0.184	0.096	0.077	0.032
x15	0.851	0.020	0.049	0.077	0.351
x16	0.849	0.085	0.034	0.014	0.001
x17	0.847	0.006	0.084	0.282	0.114
x18	0.847	0.042	0.022	0.012	0.181
x19	0.843	0.100	0.044	0.096	0.127
x20	0.840	0.199	0.145	0.109	0.006
x21	0.828	0.013	0.167	0.172	0.162
x22	0.828	0.039	0.066	0.263	0.022
x23	0.826	0.021	0.049	0.026	0.226
x24	0.823	0.156	0.008	0.012	0.061
x25	0.821	0.241	0.147	0.090	0.096
x26	0.821	0.031	0.138	0.014	0.087
x27	0.819	0.152	0.012	0.045	0.148
x28	0.817	0.099	0.050	0.035	0.016
x29	0.815	0.195	0.143	0.085	0.048
x30	0.811	0.032	0.102	0.058	0.078
x31	0.811	0.093	0.014	0.081	0.022
x32	0.809	0.030	0.143	0.043	0.074
x33	0.809	0.020	0.000	0.079	0.176
x34	0.809	0.117	0.005	0.036	0.074
x35	0.808	0.064	0.034	0.060	0.174

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x36	0.796	0.042	0.040	0.012	0.146
x37	0.794	0.153	0.006	0.058	0.022
x38	0.791	0.134	0.098	0.104	0.057
x39	0.789	0.096	0.037	0.058	0.072
x40	0.777	0.075	0.022	0.030	0.144
x41	0.775	0.047	0.104	0.016	0.075
x42	0.774	0.071	0.068	0.104	0.157
x43	0.772	0.115	0.085	0.102	0.072
x44	0.772	0.043	0.006	0.163	0.062
x45	0.768	0.137	0.100	0.142	0.032
x46	0.766	0.135	0.049	0.036	0.016
x47	0.764	0.144	0.125	0.260	0.203
x48	0.755	0.175	0.076	0.024	0.012
x49	0.753	0.132	0.046	0.005	0.069
x50	0.751	0.033	0.006	0.064	0.151
x51	0.749	0.067	0.040	0.079	0.134
x52	0.745	0.212	0.070	0.046	0.021
x53	0.745	0.089	0.026	0.003	0.005
x54	0.745	0.125	0.080	0.119	0.021
x55	0.743	0.061	0.098	0.091	0.027
x56	0.742	0.085	0.027	0.028	0.058
x57	0.740	0.119	0.028	0.008	0.073
x58	0.734	0.165	0.014	0.101	0.033
x59	0.732	0.040	0.071	0.016	0.032
x60	0.725	0.068	0.010	0.023	0.141
x61	0.723	0.169	0.034	0.086	0.073
x62	0.721	0.141	0.004	0.010	0.079
x63	0.713	0.011	0.047	0.044	0.080
x64	0.711	0.045	0.024	0.129	0.028
x65	0.706	0.136	0.018	0.103	0.039
x66	0.702	0.010	0.030	0.093	0.035
x67	0.700	0.156	0.168	0.135	0.100
x68	0.696	0.255	0.092	0.034	0.137
x69	0.692	0.036	0.005	0.066	0.076
x70	0.689	0.145	0.147	0.063	0.205
x71	0.687	0.031	0.012	0.243	0.003
x72	0.685	0.080	0.035	0.102	0.015
x73	0.683	0.009	0.022	0.135	0.033
x74	0.679	0.023	0.007	0.097	0.046
x75	0.677	0.036	0.005	0.069	0.061
x76	0.674	0.033	0.028	0.047	0.040
x77	0.672	0.077	0.058	0.167	0.062
x78	0.668	0.186	0.089	0.042	0.082
x79	0.664	0.110	0.013	0.084	0.081
x80	0.662	0.108	0.022	0.007	0.088
x81	0.660	0.127	0.012	0.070	0.077
x82	0.658	0.053	0.013	0.093	0.008
x83	0.653	0.058	0.024	0.070	0.069
x84	0.651	0.056	0.037	0.164	0.066
x85	0.651	0.031	0.016	0.129	0.218
x86	0.649	0.029	0.049	0.084	0.216

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x87	0.649	0.054	0.023	0.145	0.068
x88	0.643	0.049	0.008	0.061	0.010
x89	0.642	0.124	0.089	0.137	0.075
x90	0.640	0.009	0.016	0.196	0.044
x91	0.634	0.039	0.043	0.147	0.034
x92	0.632	0.053	0.066	0.145	0.065
x93	0.630	0.076	0.027	0.004	0.036
x94	0.626	0.006	0.103	0.061	0.076
x95	0.619	0.101	0.058	0.054	0.052
x96	0.619	0.039	0.122	0.219	0.136
x97	0.609	0.117	0.052	0.027	0.026
x98	0.587	0.115	0.053	0.039	0.003
x99	0.579	0.052	0.156	0.579	0.171
x100	0.572	0.054	0.006	0.006	0.072



### CONCLUSION

Based on the CET examination results of the college students of previous sessions, this paper applied the theory of approach degree to had a quantitative analysis on the interrelation between the English level and its influencing factors, the results of which are basically the same with that of the quantitative analysis by means of the correlation theory in the bibliography [1], i.e.:

Reading comprehension is the major factor influencing English level. It is because that the speed and accuracy of the reading comprehension is related to the mastery of grammar and vocabulary, proficiency in sentence pattern, as well as the ability of understanding and logical judgment of the text. Therefore, it is necessary to strengthen reading comprehension training in English teaching and learning.

Writing is a concentrated reflection of the mastery of grammar, sentence pattern, vocabulary, text structure, translation ability, etc. It is of great impact on the improvement of English level

Listening is also a concentrated reflection of English level, but the critical point is to listen carefully and clearly, thus the text and questions can be understood. Generally, the listening performance can not be obviously improved within short term, it needs to keep training for a long term. Therefore, listening is not the key point to improve the English level within short term.

Theory of approach degree and correlation theory play consistent roles in the quantitative analysis on the English level and the influencing factors.

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