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## Environmental Adaptation Theory and application in Standard Language Competence Model

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### Abstract

The development of The Times and the progress of science and technology have led to the transformation of teaching methods. At present, the Internet environment has covered the university campus and greatly enriched the life and learning styles of college students. In particular, the internet-based independent learning teaching mode of college English has greatly changed the traditional college English teaching mode. Among them, the adaptability of students to learning in the network environment is a common concern of teachers and students, because it is only related to the quality and effectiveness of students' learning. With the development of world economic integration, English, as a major language of communication, has become the second language of learning in China. However, due to the differences between China's education system and English education, the cultivation of college students' English ability in China is not practical. Based on the author's own teaching experience, this paper mainly discusses how to improve the adaptability of college students in English autonomous learning under the network environment. In order to find out the solution and the evaluation system of college English standard language competence in the new environment, this paper, based on the analytic hierarchy process and considering the influence factors such as practicality, professional needs, communication needs and self-cultivation, obtains the proportion of the main evaluation criteria of college English standard language competence review in China. After the change of English education environment, the evaluation indexes of college English standard language competence are the oral ability, reading ability, comprehension and application ability. Therefore, these three indicators should be taken as the key points in the evaluation of college English standard language competence.

**Keywords:** environmental adaptation, ability to assess, mathematical model

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### INTRODUCTION

"The theory of environmental adaptation. The author holds that there is an interactive relationship between natural environment and human activities, and that geography should study human's adaptation to natural environment in human-land relationship. In 1930, British geographer P.M. Rostor, influenced by the possible theory of French geography school, introduced the word "adjustment", which means both the limitation of natural environment on human activities in human-land relationship and the utilization and possibility of natural environment by human society. In addition, he believes that human geography takes human-land relationship as the research object and elaborates the adaptability of human activities to the environment from different aspects. Human geography generally includes two directions (Fu and Peng 2006, Huang 2010, Zhang et al. 2005). The second is the relationship between the people living or active in a certain area and other geographical areas.

After the reform and opening, as China's comprehensive national strength continuously improve, China also gradually in all aspects to the internationalization development. Therefore, the national English level also in rapid ascension. However, learning English for Chinese popular has adapted to the traditional education and many don't adapt with difficulty. After continuous reform, level of education in China is rapidly improve, however, due to China's education form for English education effect is not good, cause most of the college students' English study becomes the "dumb English", so it is hard to college students' English into practical English (Chen 2002, Hu 2009, Zhang et al. 2016). Aiming at these problems, China's education is to reform the English education industry, including many physical environments, social culture environment and spiritual environment, cover a Chinese college students' English level. With the change of education environment, natural mode of college English assessment standard language ability should also have a little change, this article will focus on

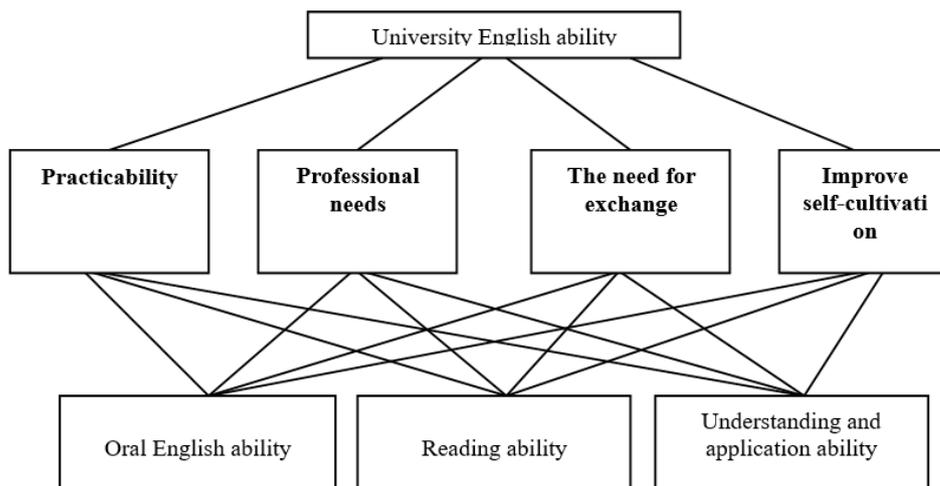


Fig. 1. Hierarchical structure

to adapt to the environment of college English standard language abilities evaluation way carries on the analysis and research.

**MODEL ESTABLISHMENT**  
**Construct Hierarchical Structure**

In order to find out China nowadays main evaluation criterions on university English standard linguistic competence evaluation, firstly it should find out most influential aspects to linguistic competence that is finding out main influence factors that affect English standard linguistic competence evaluation. Subsequently, the paper bases on analytic hierarchy process, it makes quantization on university English standard linguistic competence evaluation main evaluation criterions. And then, it establishes target layer, criterion layer and scheme layer relations (Fu and Peng 2006, Huang 2010, Zhang et al. 2005).

Target layer: University English standard linguistic competence evaluation.

Criterion layer: scheme influence factors,  $Y_1$  is practicability,  $Y_2$  is professional needs,  $Y_3$  it then need for exchange,  $Y_4$  is improve self-cultivation.

Scheme layer:  $V_1$  is oral English ability,  $V_2$  is reading ability,  $V_3$  is understanding and application ability, it gets hierarchical structure as Fig. 1 shows.

**Construct Judgment Matrix**

In order to get each factor comparison quantified judgment matrix. Now set  $a_{ij}$  to represent ratio of  $\beta_i$  and  $\beta_j$  to  $G$  influence and get judgment matrix  $A$ , in the paper set judgment matrix between layer two and layer one is  $A_1$ , element  $a_{ij}$ , divisor  $\alpha_i, \alpha_j$ , factor is  $A_1$ , then it has following formula showed judgment matrix  $A_1$ .

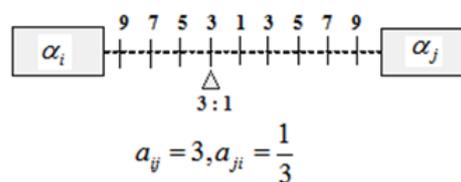


Fig. 2. Nine scale assignment schematic diagram

Table 1. Comparison matrix  $G$

G	$Y_1$	$Y_2$	$Y_3$	$Y_4$
$Y_1$	1	1/3	6	6
$Y_2$	3	1	2	2
$Y_3$	1/6	1/2	1	1
$Y_4$	1/6	1/2	1	1

Table 2. Comparison matrix  $Y_1$

$Y_1$	$V_1$	$V_2$	$V_3$
$V_1$	1	1	1/5
$V_2$	1	1	1/5
$V_3$	5	5	1

$$A_1 = \begin{bmatrix} A_1 & \alpha_1 & \alpha_2 & \alpha_3 & \alpha_4 \\ \alpha_1 & a_{11} & a_{12} & a_{13} & a_{14} \\ \alpha_2 & a_{21} & a_{22} & a_{23} & a_{24} \\ \alpha_3 & a_{31} & a_{32} & a_{33} & a_{34} \\ \alpha_4 & a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix}$$

And in above formula, for  $a_{ij}$  values defining, we generally adopt 1-9 proportion scale to assign value on influence extent, as Fig. 2 shows.

According to lots of expert's experiences and refer to lots of documents as well as 1-9 scale setting, it gets paired comparison matrix that are respective as Tables 1-5.

**Consistency Test**

Use consistency indicator test formula as:  $CI = \frac{\lambda_{max} - n}{n - 1}$ . Among them,  $\lambda_{max}$  is comparison matrix maximum feature value;  $n$  is comparison matrix order.

**Table 3.** Comparison matrix  $Y_2$ 

$Y_2$	$V_1$	$V_2$	$V_3$
$V_1$	1	5	7
$V_2$	1/5	1	3
$V_3$	1/7	1/3	1

**Table 4.** Comparison matrix  $Y_3$ 

$Y_3$	$V_1$	$V_2$	$V_3$
$V_1$	1	6	3
$V_2$	1/6	1	5
$V_3$	1/3	1/5	1

**Table 5.** Comparison matrix  $Y_4$ 

$Y_4$	$V_1$	$V_2$	$V_3$
$V_1$	1	6	5
$V_2$	1/6	1	4
$V_3$	1/5	1/4	1

It is clear that judgment matrix is inversely proportional to  $CI$  value (Hu 2009).

$$C = \begin{pmatrix} 1 & 1/3 & 6 & 6 \\ 3 & 1 & 2 & 2 \\ 1/6 & 1/2 & 1 & 1 \\ 1/6 & 1/2 & 1 & 1 \end{pmatrix}$$

$$\xrightarrow{\text{linevectornormalization}} \begin{pmatrix} 0.231 & 0.142 & 0.6 & 0.6 \\ 0.693 & 0.429 & 0.2 & 0.2 \\ 0.038 & 0.215 & 0.1 & 0.1 \\ 0.038 & 0.215 & 0.1 & 0.1 \end{pmatrix}$$

$$\xrightarrow{\text{Solvesumbyline}} \begin{pmatrix} 1.573 \\ 1.522 \\ 0.453 \\ 0.453 \end{pmatrix}$$

$$\xrightarrow{\text{Normalization}} \begin{pmatrix} 0.393 \\ 0.381 \\ 0.113 \\ 0.113 \end{pmatrix} = W^{(0)}$$

$$CW^{(0)} = \begin{pmatrix} 1 & 1/3 & 6 & 6 \\ 4 & 1 & 2 & 2 \\ 1/6 & 1/2 & 1 & 1 \\ 1/6 & 1/2 & 1 & 1 \end{pmatrix} \begin{pmatrix} 0.393 \\ 0.381 \\ 0.113 \\ 0.113 \end{pmatrix} = \begin{pmatrix} 3.941 \\ 3.825 \\ 1.145 \\ 1.145 \end{pmatrix}$$

$$\lambda_{\max}^{(0)} = \frac{1}{4} \left( \frac{3.941}{0.393} + \frac{3.825}{0.381} + \frac{1.145}{0.113} + \frac{1.145}{0.113} \right) = 4.10$$

$$w^{(0)} = \begin{pmatrix} 0.393 \\ 0.381 \\ 0.113 \\ 0.113 \end{pmatrix}$$

Judgment matrix is:

$$C_1 = \begin{pmatrix} 1 & 1 & 1/5 \\ 1 & 1 & 1/5 \\ 5 & 5 & 1 \end{pmatrix}, C_2 = \begin{pmatrix} 1 & 5 & 7 \\ 1/5 & 1 & 3 \\ 1/7 & 1/3 & 1 \end{pmatrix}, C_3 = \begin{pmatrix} 1 & 6 & 3 \\ 1/6 & 1 & 5 \\ 1/3 & 1/5 & 1 \end{pmatrix}, C_4 = \begin{pmatrix} 1 & 6 & 5 \\ 1/6 & 1 & 4 \\ 1/5 & 1/4 & 1 \end{pmatrix}$$

Corresponding maximum feature value and feature vector in successive are:

$$\lambda_{\max}^{(1)} = 4.32, w^{(1)}_1 = \begin{pmatrix} 0.314 \\ 0.223 \\ 0.420 \end{pmatrix}$$

$$\lambda_{\max}^{(2)} = 4.62, w^{(1)}_2 = \begin{pmatrix} 0.625 \\ 0.259 \\ 0.088 \end{pmatrix}$$

$$\lambda_{\max}^{(3)} = 3.25, w^{(1)}_3 = \begin{pmatrix} 0.650 \\ 0.230 \\ 0.113 \end{pmatrix}, \lambda_{\max}^{(4)} = 3.41, w^{(1)}_4 = \begin{pmatrix} 0.614 \\ 0.264 \\ 0.185 \end{pmatrix}$$

According to  $CI = \frac{\lambda_{\max} - n}{n-1}$  it gets  $RI$  value.

For judgment matrix  $C$ ,  $\lambda_{\max}^{(0)} = 4.62, RI = 1.04$

$$RI = \frac{4.62 - 4}{4 - 1} = 0.021$$

$$CR = \frac{CI}{RI} = \frac{0.021}{1.04} = 0.02 < 0.1$$

It shows  $C$  inconsistency degree within permissible range, at this time it can use  $C$  feature vector to replace weight vector. Similarly, to judgment matrix  $C_1, C_2, C_3, C_4$ , all passed consistency test by using above principle. Therefore, calculation results from object layer to scheme layer can refer to **Fig. 3**.

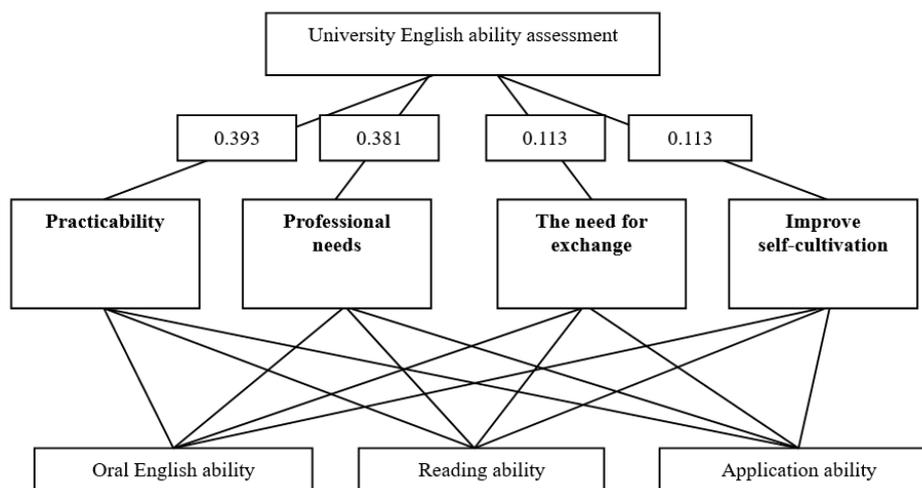
$$\begin{pmatrix} 0.314 \\ 0.223 \\ 0.420 \end{pmatrix}, \begin{pmatrix} 0.625 \\ 0.259 \\ 0.088 \end{pmatrix}, \begin{pmatrix} 0.650 \\ 0.230 \\ 0.113 \end{pmatrix}, \begin{pmatrix} 0.614 \\ 0.264 \\ 0.185 \end{pmatrix}$$

Calculation structure is as following:

$$w^{(1)} = (w_1^{(1)}, w_2^{(1)}, w_3^{(1)}, w_3^{(1)}) = \begin{pmatrix} 0.314 & 0.625 & 0.650 & 0.614 \\ 0.223 & 0.259 & 0.230 & 0.264 \\ 0.420 & 0.088 & 0.113 & 0.185 \end{pmatrix}$$

$$w = w^{(1)} w^{(0)} = \begin{pmatrix} 0.314 & 0.625 & 0.650 & 0.614 \\ 0.223 & 0.259 & 0.230 & 0.264 \\ 0.420 & 0.088 & 0.113 & 0.185 \end{pmatrix} \begin{pmatrix} 0.393 \\ 0.381 \\ 0.113 \\ 0.113 \end{pmatrix} = \begin{pmatrix} 0.353 \\ 0.314 \\ 0.333 \end{pmatrix}$$

By above analysis, it is clear that in evaluating university English standard linguistic competence process, in case considering practicability, professional needs, the need for exchange and improve self-cultivation as well as other influence factors, it gets



**Fig. 3.** Target layer to scheme layer calculation result

China universities English standard linguistic competence evaluation main evaluation criterion proportions, that oral English ability, English reading ability and English understanding and application ability proportions are respectively 0.353, 0.314 and 0.333. Thereupon, after English education environment changing, adapt to its characteristics, it gets University English standard linguistic competence evaluation indicators are oral English ability, reading ability as well as understanding and application ability. Therefore, when evaluating university English standard linguistic competence, it should focus on the three indicators to establish evaluation system.

### CONCLUSION

The paper firstly makes simple analysis of Chinese English education forms and drawbacks, and notices reformation current English education system importance. Subsequently in order to establish university English standard linguistic competence evaluation system in new environment, the paper according to analytic hierarchy process, in case

considering practicability, professional needs, the need for exchange and improve self-cultivation as well as other influence factors, it gets China universities English standard linguistic competence evaluation main evaluation criterion proportions, that oral English ability, English reading ability and English understanding and application ability proportions are respectively 0.353, 0.314 and 0.333. Thereupon, after English education environment changing, adapt to its characteristics, it gets University English standard linguistic competence evaluation indicators are oral English ability, reading ability as well as understanding and application ability. Therefore, when evaluating university English standard linguistic competence, it should focus on the three indicators to establish evaluation system.

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