



# JUDGMENT ANALYSIS ON INFORMATION AND COMMUNICATION TECHNOLOGY BASED ON ENGLISH TEACHING

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## ABSTRACT

As an important branch of modern science and technology, information and communication technology plays an increasingly important role in the modernization of education strategy and has also been widely used in modern English teaching. This paper discusses the basic concepts of information and communication technology and its application in the teaching of English. Then, based on mathematical model, the paper analyzes the application of information and communication technology in the scientific judgment of English teaching. Finally, it gets a conclusion that the application of information and communication technology is useful to modern society by the contrast of traditional English teaching and modern English teaching.

**Keywords:** *English Teaching, Information And Communication Technology, Mathematical Model, Judgment Analysis*

## 1. INTRODUCTION

Communication and exchange among humans are the major information exchange. In primitive societies, information exchange among humans mainly expressed as the language and body movements. With the continuous development of human society, people gradually mastered a variety of modes of communication. For example, people transferred messengers by horses and pigeons and flames of smoke signals. All of these are the ways of people to transmit information[1]. With the invention of electromagnetic waves, telephone and satellite communications, the development of mobile communications technology became more and more intelligent, digital and networking. Because of the convenience of information and communication technology, it has been widely used and affected on various industries and all walks of life. For example, in the paper of the influence of information and communication technology on higher education, Martin Castro and Yunchao Chen pointed out that the emergence of the information and communication technologies accelerates the fuzzy boundaries of knowledge and university educational institutions and accelerates the democratization of higher education which put forward a severe challenge to the nature and survival of the university[2]. In the paper of *Study on multiple interactive teaching mode of college English based on IT environment*, Shanjun Zhang

stated and discussed multiple interactive teaching modes of college English by using the theory of foreign language teaching and proposed a mode which is led by teachers, subjected by students and applied to English teaching of non-English majors in the university. In the paper of *Study on the influence and countermeasures of rapidly developed modern information technology on higher education teaching*, Dong Han pointed out that the development and wide application of modern information technology had a profound impact on higher education. This effect showed the diversity of higher education[3]. Talent values of colleges and universities, teaching content, teaching methods, teaching management system have undergone profound changes. In the paper of *Talk about the influence of modern information technology on higher education*, Tingting Dong, Shuangna Yu, Hui Wang discussed the application of information and communication technology in the field of modern education and the impact of higher education in the educational concepts and teaching mode. Modern society is a highly information-oriented society. Exploitation and development of information and communication technology is a sign of modern society. Information and communication technology is a double-edged sword which is convenient to people and also has a negative impact on people.

**2. BASIC CONCEPT OF INFORMATION AND COMMUNICATION TECHNOLOGY**

Information and communication technology refers to the information technology and communication technology. They represent two different areas at the beginning of the development of information technology and communication technology. IT focuses on the encoding or decoding of a variety of information, and communication technology focuses on the dissemination of information transmission technology[4]. With the development of science and technology, the contact of these two technologies is closer. They slowly blend into a category.

**2.1 The Concept Of Communication System**

Communication and exchange of information are the basic needs of human life. Information is an important social resource. Development and use of information is a sign of the development of the productive forces of modern society. Information, matter, energy are the three basic elements of the society, which is shown in Figure 1.

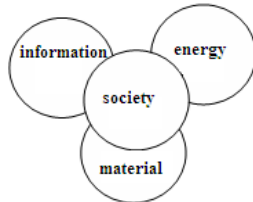


Figure 1: Schematic Diagram Of Social Elements

Information and communication technology can achieve the transmission and conversion of information. It primarily uses the information communication network of various information transmission media and information conversion mechanism. It achieves transmission and conversion of the information through two terminals and constitutes a complete information communication system, which is shown in Figure 2.

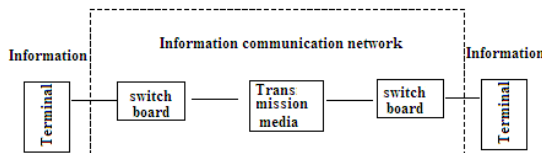


Figure 2: Diagram Of Information And Communication System

A complete communication system includes the following components: the sender, interference source, receiving terminal. Sender is composed by information source and the necessary transmission equipment, and the receiving terminal is composed by receiving equipment and Information sink.

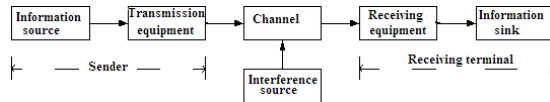


Figure 3: Communication System Models

Information source means a person or device that sends out information which can convert the initial information into an electrical signal. The main function of the transmission device is to convert the information transmitted by the information source into the appropriate information form transmitted in channel by amplifying the signal and transform spectrum. Channel refers to transmission media which has the shape of wireless and wired. The function of receiving equipment is contrary to the function of sender. Information sink is the terminal of information. Interference sources occur in the various aspects of the communication system which is unavoidable.

**2.2 The Concept Of The Amount Of Information**

The amount of information is the main object of information and communication technology, which refers to the number of information. The amount of information I and probability of information appeared P (x) has a function relationship: When the information probability increases, the amount of information will be reduced. On the contrary, when the information probability decreases, the amount of information will increase. Function relationship is[5]:

$$I = \log_a \frac{1}{p(x)} = -\log_a p(x) \tag{1}$$

Generally, a discrete information source can pass a lot of independent information. The occurrence probability of the information is different, so the amount of information they contain is different. So, we should consider entropy of information. Entropy can be calculated by the amount of information through weight and sum of the occurrence probability. The formula is shown as follows:

$$H(x) = -\sum_{i=1}^n p(x_i) \log_2 p(x_i) \tag{2}$$

The process of the amount of information is a crucial issue with the development of information and communication technology. The transmission amount of information of the communication system is the constant pursuit of the people. Limiting transmission of information in communication system is the ideal of people.



### 3. APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN ENGLISH TEACHING

With the continuous development of modern society, information and communication technology is increasingly important in the development and progress of science and technology. Modern society is a technology-driven society which has the growing demand for scientific talents[6]. Highly information-oriented society has put forward higher requirements for teaching in schools also. The application of information and communication technology in modern teaching is the complement and enhancement of the traditional classroom teaching. The combination of modern information and communication technology and traditional classroom teaching is a direction of the development of China's education.

#### 3.1 Application status of information and communication technology in English teaching

Penetration of information and communication technologies in various fields of social life brings a lot of changes to the lives of people, so as the modern education. Information and communication technology widely used in modern English teaching has changed the teaching method and philosophy. This paper investigates English teaching molds of several universities and middle schools in China's central region. The results are shown in Table 1.

From Table 1, we can see that the information and communication technology has been widely used in universities and secondary schools currently. But it is used in university more common than secondary school. This indicates that the education sector in China attaches great importance to the application of modern technology. At the same time, we can see that because of the weakness of primary school teachers, there are limitations on the use of modern technology which requires a common concern of the government and the community to the construction and development of the primary and secondary schools.

Table 1: The Survey Of Usage Of Modern Information Technology In Central China

University class	teaching class using the information technology	teaching class not using the information technology	total class	utilization rate of information technology
one class university	100	0	100	100%
Two class university	98	2	100	98%
private university	98	2	100	98%
higher vocational colleges	95	5	100	95%
vocational schools	90	10	100	90%
senior middle school	87	13	100	87%
Junior middle School	80	20	100	80%

#### 3.2 Contrast Between Modern English Teaching And Traditional English Teaching

Information and communication technology has a positive role in the application of modern English teaching for teaching of teachers and learning of students[7]. It can save a lot of teaching time, increase the teaching capacity of a single class and stimulate students' enthusiasm of learning. Although there are a lot of advantages in the use of information and communication technology in the modern English teaching, the traditional English teaching is not without merit. This paper compares the effect of the two teaching methods using analytic hierarchy process.

The main factors affect the effectiveness of teaching: teaching method, teaching content and teaching object. Assuming these main factors indicators as  $X = (X_1, X_2, X_3)$  and weight set is  $A = (a_1, a_2, a_3)$ . Defined sub-factors layer refers to

$X_k = (X_{k1}, X_{k2}, \dots, X_{ks})$ ,  $(k=1,2,3)$  and weight set is  $A_k = (a_{k1}, a_{k2}, \dots, a_{ks})$ . Assuming that contrast set is  $W = (W_1, W_2, W_3, W_4)$ . The comparative results are excellent, good, fair, and poor. Assuming that slave vector  $B_k$  of contrast set  $W$  on main influencing factors  $X_k$ , so,  $B_k = A_k \cdot R_k = b_{k1} \cdot b_{k2} \cdot b_{k3} \cdot b_{k4}$ . This is recorded as follows[8]:

$$R = \begin{bmatrix} B_1 \\ B_2 \\ B_3 \end{bmatrix} = \begin{bmatrix} b_{11} & b_{12} & b_{13} & b_{14} \\ b_{21} & b_{22} & b_{23} & b_{24} \\ b_{31} & b_{32} & b_{33} & b_{34} \end{bmatrix} \quad (3)$$

So,

$$B = A \cdot R = [a_1, a_2, a_3] \cdot \begin{bmatrix} B_1 \\ B_2 \\ B_3 \end{bmatrix} = A \cdot \begin{bmatrix} A_1 \cdot R_1 \\ A_2 \cdot R_2 \\ A_3 \cdot R_3 \end{bmatrix} = [b_1, b_2, b_3] \quad (4)$$

We can establish the matrix of influence of main factors and secondary factors on modern English



language teaching and the traditional English teaching which is shown in Table 2.

Table 2: Table Of Primary And Secondary Factors

	X_1	X_2	X_3
X_1	1	2	4
X_2	1 / 2	1	2
X_3	1 / 4	1 / 2	1

After we get the matrix list, we can calculate the weight set of main factors based on the MATLAB software is  $A=[0.5716,0.2854,0.1425]$ . We can get  $B=[0.1796,0.3325,0.2374,0.2493]$  through the substitution of  $A=[0.5716,0.2854,0.1425]$  into the above model. We can see from the results that information and communication technology is superior to the traditional English teaching methods in modern English teaching. Of course, traditional teaching methods cannot be completely denied, and the effect of the effective combination of the two will be more obvious.

Information and communication technology represents a new multimedia technology which includes computer software, CD-ROM, Internet, mobile phone, TV, movies and Internet based on project work, email, chat, blogs, wikis, podcasts, etc. A large quantity of studies have been done that, information and communication technology has better effect in the use of language on students' language learning and understanding, it also increase the enthusiasm of the students and achievement in the use of information and communication technology[9,10]. In addition, the study also found that, if the students think the information and communication technology could help them in their long-term future, they will spend more time using information and communication technology. Information and communication technologies can help promote students, simply, enhance their language learning in communication skills and self-confidence, information and communication technologies can also improve students' computer literacy, enhance their cultural awareness, and develop their social identity in the target culture.

Information and communication technology in English teaching not only can increase visual and auditory ability of students on English Teaching, but also achieve the sound in one effect, enhance image, video and text as one of the fusion[11-13]. Because the specialty of intensive reading materials in English teaching has been made great popularity, especially, there are more and more universities or private, public schools, which use readily available materials for English teaching, and follow preferences of the administrative and teaching staff to provide and prepare the syllabus.

At the same time, it also should have certain criteria to evaluate these methods. When it has different standards to choose, the actual factors should be taken into account, such as teaching reference in order to adapt to the new era. In this context, the use of information and communication technologies can effectively arouse students' enthusiasm in English teaching, strengthen students' interest, create a good, relaxed and lively English atmosphere, effectively improve the efficiency and quality of teaching, and better promote students' English competence.

#### 4. JUDGEMENT ANALYSIS OF INFORMATION AND COMMUNICATION TECHNOLOGY BASED ON THE ANALYSIS OF MATHEMATICAL MODEL

With the development of information and communication technology, it brings great convenience for people in all walks of life. However, everything has two sides and information and communication technology also produced a number of troublesome issues when it brought convenience for people[14]. This paper takes modern English language teaching as example and analyzes the pros and cons of the information and communication technology using a mathematical model which is shown as follows.

Assuming that information and communication technology is judgment object P. Factor set affecting its pros and cons is  $U = \{u_1, u_2, \dots, u_m\}$ , and judge level set is  $V = \{v_1, v_2, \dots, v_m\}$ . We can evaluate and analyze factors impacting the pros and cons of the information and communication technology based on different levels of indicators of the evaluation set. We can get evaluation matrix of information and communication technology which is shown as follows[15]:

$$R = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1m} \\ r_{21} & r_{22} & \dots & r_{2m} \\ \dots & \dots & \dots & \dots \\ r_{n1} & r_{n2} & \dots & r_{nm} \end{bmatrix} \quad (5)$$

In the matrix (5),  $r_{ij}$  is subordinate degree of influencing factors set  $u_i$  to judge level indicators  $v_j$ . So, we can get the evaluation model (U,V,R) of information and communication technology. We can report the weight coefficient of various factors as  $A = \{a_1, a_2, \dots, a_n\}$  which



met  $\sum_{i=1}^n a_i = 1$  and merged and simplified as  $B = \{b_1, b_2, \dots, b_m\}$ .

In evaluation model (U,V,R), each factor  $r_j$  in the matrix R is determined by score of each judge. Through the investigation of the above-mentioned

formula (1), we can get  $\{\frac{C_{i1}}{k}, \frac{C_i}{k}, \dots, \frac{C_{im}}{k}\}$  by regulate the judgment of k judges

and  $\sum_{j=1}^m C_{ij} = k, i = 1, 2, \dots, n$ .  $\frac{C_{ij}}{k}$  is subordinate degree of  $u_i$  to judge level indicators  $v_j$ .

When we determine index weight coefficients of various impact factors, we can analyze the judgment result of the information and communication technology carried according to the weight coefficient of the judged level. For the N judged levels, we can divide the interval average. When N is 4, the four intervals are [0,0.25][0.25,0.50][0.50,0.75][0.75,1.0]. We can

get  $\sum_{i=1}^N \frac{d_{ij}}{k} [a_i, b_i] - [a^j b^j]$  by the sum of j index coefficients  $[a_{1j}, a_{2j}, \dots, a_{nj}]$ .  $d_{ij}$  is the amount of  $[a_i, b_i]$  in array set  $[a_{1j}, a_{2j}, \dots, a_{nj}]$ .

When  $\xi_j = \frac{1}{2}(a^j + b^j)$ , we can substitute  $j=1, 2, 3, \dots, n$  into the above formula and get  $\xi_1, \xi_2, \dots, \xi_n$  and  $A = \{a_1, a_2, \dots, a_n\}$  after processing.

When  $\xi_j \in [a_i, b_i]$ , evaluation results of  $a_i$  is  $\frac{d_{ij}}{k}$ . Judgment result set is  $\{C_1, C_2, \dots, C_n\}$ .

Assuming  $C_1, C_2$  are two evaluation results. They can be compounded as [16]:

$$C = \epsilon \min\{C_1, C_2\} + (1 - \epsilon)\{C_1 + C_2\}/2 \quad (6)$$

$$C = \epsilon \max\{C_1, C_2\} + (1 - \epsilon)\{C_1 + C_2\}/2 \quad (7)$$

When  $\epsilon = 1 - \min\{C_1, C_2\}$ ,

$$\beta_j = \epsilon \max\{\theta_{1j}, \theta_{2j}, \dots, \theta_{mj}\} + \frac{1}{n}(1 - \epsilon) \sum_{j=1}^m \theta_{ji}, i = 1, 2, \dots, m \quad (8)$$

And,

$$\theta_{ji} = \epsilon_j \min\{C_j, r_{ji}\} + (1 - \epsilon_j)\{C_j + r_{ji}\}/2, j = 1, 2, \dots, n \quad (9)$$

We can get the evaluation result of the information and communication technology through the calculations of above formula:

$$\bar{B} = \{(\bar{b}_1, \bar{\beta}_1), (\bar{b}_2, \bar{\beta}_2), \dots, (\bar{b}_m, \bar{\beta}_m)\} \quad (10)$$

We can substitute the results of the investigation into the above formulas and can conclude through the operation that the convenience brought by the

application of information and communication technology to modern society is far greater than the disadvantages [17]. The convenience of information and communication technology is more and more popular in various fields of modern society.

The development of information and communication technology has led to the dramatic changes in almost all regions of social and global world. A similar change is the fundamental education, similarly, changes in the language learning environment. In this respect, change requires the use of information, communications technology tools and applications to integrate all aspects of language learning process, such as teaching, learning, curriculum setting, management as well as the material, particularly as a professional teaching materials, the main media use information and communication technology in English teaching. In addition, learners of information and communication technology provide more personalized learning experience; such cooperation is to promote autonomous learning and lifelong learning. However, now the information communication technology tools range is still limited to the Internet, CD-ROM, DVD and certain types of audio material [18]. Other information and communication technology tools are currently available professional intensive textbooks of supplementary material, but they are totally separate courses without any connection to the content of textbooks. Therefore, these neglected information and communication technology tools will not be included in the teaching; briefly, it is to maintain the existing curriculum or teaching plan. Introduction and increasing use of information and communication technology in English teaching and learning will be easier to operate and popularize. In short, the positive potential community of information and communication technology in the teaching of English in the technology and materials has been fully recognized, but the lack of the effective integration of information technology into the teaching reform of current uses and sustains in training teachers, so we must strengthen the information technology application in English teaching, in order to enrich the learning environment, improve the classroom efficiency, improve the quality of teaching, cultivate students' interest in the classroom and the learning initiative, and lay a solid foundation for English teaching.

## 5. CONCLUSION

With the continuous development of the information society, information and communication technology as new science and technology has widely affected all walks of life in modern society and changed people's lives and the ways of communication. This paper took the application of information and communication technology in the modern English language teaching as an example and described the convenience and change of modern society brought by information and communication technology through mathematical model. Because the continuously improvement of modern society demands and the science and technology, information and communication technology will continue to be developed and applied.

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