# An Innovative English Teaching System Based on Computer Aided Technology and Corpus Management

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Abstract—With the development of modern science and technology, more and more computer technologies have been successfully applied in English teaching. Based on computer aided technology and big data corpus management, this paper improves the traditional teaching method into an innovative teaching mode with a big data corpus as English learning resource. On this basis, a computer multimedia teaching system was set up to realize automatic matching of subtitles and vivid restoration of contexts. The teaching system achieved excellent results in application verification. The research results can promote computer technology in English teaching.

Keywords—Corpus management, English teaching method, innovative thinking, computer technology

### 1 Introduction

Corpus is a big electronic library with certain capacity established based on certain linguistic principles, with adoption of random sampling method and through collecting continuous language use texts or discourse segments appeared naturally. Applying corpus to English teaching can provide rich context for learners and is good for the language knowledge construction for the learners [1-3] The idea of making use of rich context of corpus to assist learners to accomplish active construction for language knowledge and the idea of teaching design based on constructivism stressing the important function of "context" for meaning construction is consistent. Researches about corpus in recent years have achieved great development, but there is certain technical difficulty in the application of powerful English corpus [4-7]. Therefore, in the mainly applications in abstract linguistic research field, dictionary compilation field as well as propositional work of important examinations, the majority of teachers lack necessary understanding of corpus [8]. This situation produces extremely low application rate of corpus in the field of computer assisted English teaching and its application potentiality has not been well explored [9-12]. There are also few researches on the important application value of corpus in assisting English teaching in educational technology circle.

With the continuous improvement of computer performance and continuous decrease of price as well as the rich English electronic publications and network English

text resources and the popularization of scanner in teaching field, it is possible for individual teachers or small teaching collective to construct corpus for teaching [13-15]. Applying corpus into English teaching can help to change the traditional teaching mode focusing on teacher and assist the application of data driven learning model based on constructivism [16-19].

# **2** Basic Function of Corpus Index Software

### 2.1 KWIC index

The basic analysis methods of corpus are full text retrieval and word index. Word index form in most of corpus index software is KWIC index, which is "keyword search with context" [20]. Different corpus index software has different naming for key words and the key word in Concordance 3.2 is called as Headword. The following Figure is the KWIC index (making use of Make Full Concordance function) attained from full text retrieval for 1-6 text books of college English intensive reading with adoption of Concordance 3.2, in which Figure 1 is the alphabetical order of key words and Figure 2 is frequency order of key words.

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Headword	No.	%	-	Context.	W	Context	Line		į
A	1566	2.404	3	but you probably think you will never		top student.	9	-	3
ABANDON	1	0.002		Make	a	list of your weekly tasks.	10		
ABANDONED	2	0.003		Then make	a	schedule or chart of your time.	10		
ABDOMEN	1	0.002		Find	a	good place to study.	11		
LEE	1	0.002		It may be		desk or a chair at home or in the scho	11		
BILITIES	5	0.008		It may be a desk or	a	chair at home or in the school library.	11		
BILITY	16	0.025		This means looking over	a	passage quickly before you begin to r	12		
BLE	42	0.064		Develop	a		15		
BOUNDED	1	0.002		The purpose of		test is to show what you have learned	15		
EOUT	183	0.281		The purpose of a test is to show what			15		
DOVE	9	0.014		The world wont end if you dont pass	a	test	15		
ERAHAM	4	0.006		so dont worry excessively about	a	single test.	15		
ERIDCED	1	0.002		Only		few have been mentioned here.	16		
BSENCE	2	0.003		Hereceived	a	warm welcome from the Australians a	28		
ABSENT	1	0.002		After resting in Sydney for	a	few weeks.	29		
ESENTLY	1	0.002		unless there was	a	ship nearby,	30		
BSENTML	1	0.002		I feel as if I had wakened from			31		
BSOLUTE	4	0.006		where		guarter of a million people were waiti	32		
BSOLUTE	7	0.011		where a guarter of		million people were waiting to welcom	32		
DSORB	2	0.003		and Myra herself had got	a		43		
BSCRBED	2	0.003		and teach in		primory school round the corner.	44		
ESTRAC	2	0.003		Morrison to look after you for	a	Contraction of the second s	45		
BSURDLY	1	0.002		Tomorrow I have to go into hospitaljust	a		45		
UNDANCE	1	0.002		cighty was	a		48		
UNDANT	2	0.003		she would send	a		49		
CADEMIC	5	0.008		She was excitedlike	a	child.	49		
ACADEMI	1	0.00Z		and today she had brought		card and a bunch of marigolds when s	50		
CCELERA.	1	0.002		and today she had brought a card and		bunch of maricolds when she came to	50		
CCELERA.	2	0.003		Grant downstairs had made		cake.	50		
CCELERA	1	0.002		had been up with		packet of mints,	50		
ACCELERA	1	0.002	1		A		52	-	Į
ICCENT	2	n nna 🛄		t word Word ast	-			_	ĺ

Fig. 1. According to the keywords of the KWIC alphabetical index

Headword   No.   %   A     Itil:   7142   54872   a top student. This is not necessa   the   case,   9     Itil:   7142   54872   course, studying shouldh course, the pring shouldh course, the schedule.   10     OF   3506   2.692   nor a chair at home concentrat   the course, studying shouldh course   11     A   3132   2.404   you should be able to concentrat   the course studying shouldh course   schoul library,   11     Yu   2094   1.607   you reine in choss   schoul ibrary,   11     THAT   1764   1.354   you reine in choss   schoul ibrary,   12     THAT   1764   1.607   Take netse to help you reinembe   the teacher says in class means less   13     THAT   1162   1.668   you reine in chose   14     YOU   1066   102   166   you reine in chose   14     YOU   1066   260   15   worl what the teacher will db   15     S   178	🗢 M 🧀 🖬	a 10		BIUPI. ®					
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Fig. 2. frequency of keywords KWIC index

# 2.2 Corpus basic parameters statistics

Concordance 3.2 includes some statistical functions for the basic parameters of corpus. Figure 3 is the statistical results for the basic properties of 1-6 text books of college English intensive reading with adoption of Concordance 3.2:

Source file	E:/corpus/cmail/IR- 1-6.txtPlus1MoreFile.txt
Lines	3556
Words (types)	Now: 7658 When loaded: 7658
Words (tokens)	Now: 130290 When loaded: 130290
Type-token ratio	Now: 17.0100 When loaded: 17.0100
Characters	569106
Sentences	8400
Vords/sentence	15.5107
Current word	THE
Occurrences	7142
Context style	Actual line

Fig. 3. Corpus properties

In which, it includes types, tokens, type-token ratio, words/sentences and other parameters mentioned in the former introduction of common statistical parameters in corpus.

Make statistics for the word length distribution situation in corpus with word length distribution function, which is with important reference value for judging the difficulty of corpus text and language style [21-24].

Figure 4 is the word length distribution map of 1-6 text books of college English intensive reading with adoption of word length distribution.

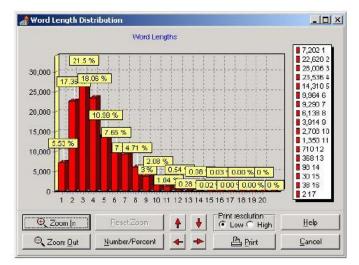


Fig. 4. Word length distribution

It can be seen from Figure 4 that there are 235364 tokens with word length at 4, accounting for 18.06% of the total tokens; there are 39149 tokens with word length at 9, accounting for 9% of the total tokens.

#### 2.3 Collocation statistics of key words

Most of corpus retrieval software provides statistics for the frequency of collocation of key words and other parameters and some also provide the calculation function of collocation force between collocation words and key words [25-27]. Figure 5 is the statistical result for the collocation words of key word able in 1-6 text books of college English intensive reading with adoption of the collocation function of Concordance 3.2 [28-31].

It can be seen from the results that collocation function offers the statistical results of four words of one key word before and after the collocation position [32-34]. It can be seen from the example that the appearing frequency of be at 1-left position and to at 1-right position is obviously higher than other collocation words [35]. After making lemmatization for various forms of verb be, the situation becomes more obvious. It

explains that in 1-6 text books of college English intensive reading, the fixed collocation "be able to" is with the highest appearing frequency among various uses of word able and should be emphasized. This frequency information can't be attained when searching the usage of one word in English dictionary, while if this frequency advantage is very distinctive, it is very necessary for the construction of language knowledge and skills.

1 right	No.	2 right	No.	-	3 right	No. 🝝	4 right	No.	-
То	39	Do	3		The	6	A	2	
Bodied	2	Join	3	1	Hands	3	And	2	
Children	1	Avoid	2		A	2	Information	2	
		Buy	1		Down	2	To	2	
		Change	1		łt	2	About	1	
		Command	1		Them	2	At	1	
		Comprehend	1		Things	2	Course	1	
		Concentrate	1		Up	2	Deer	1	
		Describe	1	-	With	2 🔫	Dream	1	
		4	1 +		4	1.	Embarrassi	1	-
			-					1	1
4 left	No 🔺	3 left	No	1 🔺 🛛	2 left	No 🔺	1 left	No.	
			10000			and an other states of the state of the stat			10
And	3	We	6		VVill	10	Be	19	1-
And	3		6 3		Will Be	10 2	Be Being	5	-
And Faith I	3 3 3	Vve Not	6 3 2		Will Be Have	10 2 2	Be Being Been	5 3	
And Faith I	3	VVe Not I May	6 3 2 2		Will Be	10 2 2 2	Be Being Been Was	5	
And Faith I Would	3 3 3	We Not I May Accomplished	6 3 2 2		Will Be Have	10 2 2 2 2 2	Be Being Been Was Less	5 3 3 2	
And Faith I Would Perhaps	3 3 3 3	We Not I May Accomplished Advantage	6 3 2 2		V/II Be Have He	10 2 2 2 2 2 2 2	Be Being Been Was	5 3 3 2 2	
And Faith I Would Perhaps A	3 3 3 3 2	We Not I May Accomplished	6 3 2 2 1		Will Be Have He In	10 2 2 2 2 2 2 2 2 2	Be Being Been Was Less	5 3 3 2	
And Faith I VVould Perhaps A Being	3 3 3 3 2 1	We Not I Accomplished Advantage But Catholics	6 3 2 2 1 1		Will Be Have He In Not	10 2 2 2 2 2 2 2	Be Being Been Was Less Most	5 3 3 2 2	
	3 3 3 3 2 1 1	We Not I May Accomplished Advantage But	6 3 2 2 1 1 1		Will Be Have He In Not Of	10 2 2 2 2 2 2 2 2 2	Be Being Been Was Less Most Were	5 3 2 2 2	

Fig. 5. The statistical results of key words collocation

# **3** Source of Corpus

### 3.1 Electronic publications

With the increasingly rich electronic publications, it becomes very convenient and efficient to make use of the text provided by electronic publications as the source of corpus in teaching, especially some English learning materials, English texts and encyclopedia etc. in the form of electronic text [36].

Mp3 voices and corresponding texts are usually provided in English learning materials, such as various kinds of published VOA, BBC news English learning CDs as well as electronic discs of English salons and English abstracts; all of them can extract the text as corpus.

Some special English corpuses provide literature in text form and academic article, which can be used as an important source of corpus. For example, English Classics

1000 published by Fudan University Press provide two searching methods based on works name and author name, covering famous literature and academic works of English history, which is a valuable source of corpus.

English news is in close relationship with current affairs and life, which can timely reflect the changes and developments of contemporary English and represent the characteristics of contemporary English; therefore, it is an important source of corpus for English teaching. English news text can be collected from some famous English news websites and English news learning websites both at home and abroad.

#### 3.2 Film subtitles

Use film subtitles to construct an audio and visual corpus for English learning is a field that has been ignored for a long time. This kind of corpus can be combined with related film and television resources and can be used to improve the English reading ability, translation ability and listening ability [37]. There are usually two ways to attain subtitles [38]; one is to extract dialogue from script text and the other is the extract from the plug-in subtitle file of film and television material.

Subtitles of most film and television materials on current network adopt plug-in form. Plug-in subtitle files focus on srt files, which can be opened directly by notepad as text file and is good to be used as the source of audio and visual corpus. We take the plug-in subtitles of the second part of film the Sound of Music as example to explain the structure of srt file [39-40].

It can be seen from this example that the plug-in subtitle file structure of srt form consists of three parts; the first part is number, which is the subtitles appearance order, as 1, 2, 3, 4 in above example; the second part is the duration time of this subtitle on screen, such as 00:00:15,975 --> 00:00:18,808 in above example, indicating that the following subtitles will be displayed on screen from 00:00:15,975 to 00:00:18,808; the third part is subtitle content, such as "Dear Father, now I know why you sent me here" in above example. This kind of subtitle file in srt form can be found on internet and usually Chinese-English corresponding subtitle can be found. There are many good websites providing subtitle downloading service for free and one of the comprehensive and famous websites is shooter website (http://www.shooter.com.cn).

#### 3.3 Scan written text

At present, scanner can be attained easily for most of teachers. The error rate of transferring English written text into electronic text is very low, which can be accepted completely. When the teachers have English books, newspapers and other written materials suitable to be added into corpus on hand, while corresponding electronic text can't be attained from electronic resources and network resources due to copyright issue, adopting scanner will be the first choice.

# 4 Application Corpus for Teaching

Collect constructed text corpus for teaching with adoption of corpus index system and some other computer software tools with combination of above methods and many specific functions can be realized. We take Concordance 3.2 as example to explore some specific application mode of corpus for teaching.

### 4.1 Review vocabulary through KWIC index of intensive reading textbooks

In the former, we have introduced the KWIC index of all types in teaching material through indexing intensive reading textbooks. This can be a good material and tool for learners to review words. Through KWIC index, the learners can realize the construction and strengthening of language knowledge in a better way with the assistance of the specific application environment of each word in teaching material. Produce KWIC index into webpage form to upload to related websites assisting learners, as the tool of assisting learners to construct vocabulary knowledge.

### 4.2 Vocabulary learning model of learning environment model

Vocabulary learning model of learning environment model based on the constructivism of Jonathan stresses the active construction of learners for vocabulary knowledge under the guidance of teachers. In the process of vocabulary knowledge construction, rich and real example sentence with context for one or some key words is an essential condition. The learners need to make full exploration and consideration for example sentence and context and attain own conclusions. There can be adequate cooperation and discussion among members within the team. Main conclusion of this group can be proposed by taking this group as a unit to mutual reference and discussion among each group. Teachers can offer necessary help and guidance when necessary. It can also be verified in English dictionary. But it should be realized that not all the vocabulary information in dictionary is comprehensive and adequate. The significance of this learning mode lies in that realize active vocabulary meaning construction through exploring a lot of real contexts where vocabulary appears, but not lies in whether the summarization of learner is comprehensive and perfect; most of discussions are open and not taking seeking for standard answer as purpose. The following example is used to explain vocabulary learning model of learning environment model based on the constructivism of Jonathan.

Figure 6 is to guide the students to make usage classification process for round with adoption of all contexts for round (32 in total) extracted from 1-6 text books of college English intensive reading. Figure 7 is deleting key word interest and used to guide students to make exercise of filling in blanks with adoption of all contexts for interest (10 in total) extracted from 1-6 text books of college English intensive reading with adoption of concordance 3.2. It has to point out that the main purpose of exercise of filling in blanks is reading and speculation for context and it is not important whether it can attain the deleted key word. On one hand, the context provided by the teacher is not adequate enough, which can attain the key words easily, under

this situation, it is difficult to get results. But the exploration and discussion of learners within the team for context reaches the purpose of study and communication; on the other hand, the answer of filling in blanks is not the sole and can be open (especially under the situation with less co-occurrence times of context), all the answers can be accepted as long as meeting grammar, logic and context condition. It can be seen that this kind of vocabulary learning model of learning environment model based on the constructivism of Jonathan is on the contrary to traditional indoctrinate vocabulary teaching. Real corpus, open problem and discussion and cooperation among team members are good for improving the interest and enthusiasm of learner. This method also provides a new idea for computer assisted English teaching.

	0 × Pa	n 🖻 🖻 🖻 🖻	🖌 🖳 📱 📔 🕼						
Headword	No. 4			Context	Word	Context	7		
RISE	7		Chichester set out to sail	singlehanded	round	the world.	1		
RISING	4		is the story of that adventur	e. Sailing	Round	the World Before he sailed round			
RISK	4		Sailing Round the World Bel	ore he sailed	round	the world singlehanded,			
RISKS	2		several times. He ha	d tried to fly	round	the world but failed.	To the second		
RIVER	3		sailing race. His old dr	eam of going	round	the world came back,	11		
RIVERFRONT	1	m	ore dangerous part, during wi	hich he sailed	round	the treacherous Cape Horn.	11		
RIVERS	2	island	miles away. After succeed	ling in sailing	round	Cape Horn.	1.		
ROACHES	1		sword that Queen Elizabet	h I had sailed	round	the world for the first time.			
ROAD	7		mother, and teach in a pr	imary school	round	the corner.	11		
ROADS	1	by t	he window, watching. The pos	tman turned	round	the corner on his bicycle.	14		
ROAM	3		say that love makes	the world go	round		46		
RUAMING	1		is energy that makes	the world go	round	14			
ROAR	2		death, too is a cy		round	and round.	18		
ROB	1		is a cycle that go		round		10		
ROBBED	2		Can you prove tha		round	2	11		
ROBBINS	1			HE EARTH IS	ROUND	2	11		
ROBERT	1		the widespread belief tha	t the earth is	round		11		
ROBOTS	1		reason for thinking tha		round	2	11		
ROCK	1		do we believe tha	t the earth is	round	2	llk		
ROCKET	1		spherical. I only know	hat they are	round	<u>.</u>			
ROCKIES	2		appears to be the		round	object.	18		
ROCKS	1		know, tells me tha		round		11		
ROCKY	1	an	cient Egyptians, who thought		round	the earth,	11		
ROD	1		card left: navigation. People		round	the world.	1H		
RODE	1		reasons for thinking tha		round	are rather precarious ones.	11		
ROEBUCKS	1		asked to prove tha		round		11		
ROGER	1		that everyone knows the earth to be round .						
ROLE	8		is generally accepted as the greatest all round athlete of the state of the th						
ROLL	3		that everyone knows the earth to be round , is generally accepted as the greatest all round athlete of the the former of the the constraints of the the constrai						
ROLLED	2		she said after a little s		round	with recovered mmand.	al		
ROLLING	2	1 1					-		
PRIIS						<u> </u>			
Words	Tokens	At word	Word sort	Context a	ort				
7657	65145	5926	Asc alpha (word)	1.	irrence crd	N			

Fig. 6. Round in intensive reading materials corpus in the context

at the row of puddings with great	•
may of his ideas still of great	to us.
theorist. He didnt have the slightest	in the practical application of his ideas and theories.
expose corruption or to promote the public	
science thus becomes a matter of self	to scientists.
distinguish himself. He partied, took a great	in rowing and studied only an hour or so a day.
be drawn from those results. Of primary	in business and technical research reports is the valid
not of the most intense and fascinating	to anyone with whom he came in contact.
better way, he argues, to stimulate their	in thing scientific?
on among scientists. Big arguments stimulate their	

Fig. 7. Interest in intensive reading materials corpus in the context

### 4.3 Assisted teaching with combination of English film and television information and film and television corpus

Assisted teaching with combination of English film and television information and film and television corpus can create two vivid contexts for learners. One is audio and

visual context composed of film and television information and the second is textual context which is easy to check and compare and composed of film and television subtile text and corpus. It is in line with that teaching design of constructivism "stressing on the important role of context for meaning construction". Film and television material assisted English teaching needs to possess two conditions. One is English dialogue and the other is English subtitles (it is better to have Chinese subtitles and make it easy for reference). A lot of English films in DVD form provide two kinds of subtitles of Chinese and English. If play the film files in other forms (such as avi or rmvb), it can consider about using MPC (Multi-Player Classic) with plug-in subtitle to reach the purpose of selecting Chinese and English subtitles. It must pay attention that when use plug-in subtitles, plug-in subtitles must have the same name as its corresponding film file and also in the same file.

# 5 Conclusion

In a long-term run, corpus is mainly controlled by linguists as well as compliers of major examination proposition groups and dictionary as a powerful weapon for foreign language learning and research. Its potentiality in the field of computer assisted teaching has not been well explored and the popularity degree is very low. There are active researches on computer assisted teaching field, which is with wide application and weak disciplinary uniqueness in education technology circle, while neglect the researches that corpus assisted English teaching has great significance in certain discipline teaching field.

This paper introduces related knowledge and theory of corpus, discusses the theoretical basis of computer assisted English teaching based on corpus and makes preliminary discussion on the classification of teaching corpus as well as the application method of corpus with different contents in English teaching aroused by classification thought. It makes pioneering attempt in adopting film subtitle file to extract corpus for assisted teaching and constructs one film corpus library containing over 110 films with English subtitle and with over 1.1 million words. It is hoped to play the role of trigger and arouse the interest and emphasis of education technology circle for corpus assisted English teaching with great potentiality.

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