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Research Article

Teaching Reform Strategies for the College Public English Course Driven by Source Problems under the Cognitive Neuroscience View

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Abstract

According to cognitive neuroscience research, cognitive activities in the human brain are involved in processes like knowledge input, information processing and cognitive output. Just like with other knowledge, the acquisition of linguistic knowledge is a process of information processing, and the psychological representations such as perception, presentation, memory, understanding and consciousness in neurocognitive activities restrict the process of information processing. With the development of the times, English teaching has been playing an increasingly important role in education. The college public English course, in particular, has an even direct influence on the English level of graduates. Therefore, teaching reform is imperative for this course. Starting from the source problems of English teaching, this paper puts forward suggestions on the teaching reform of the college public English course from the perspective of neurocognition, in order to improve students' comprehensive English abilities.

Keywords

Neurocognitive Science • Public English Course • Reform Strategy • Original Issues

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Since its birth, cognitive neuroscience has undergone three stages of development: the first stage was from the 1950s to the 1970s, known as the first-generation cognitive science, which advocated dualism, symbolism, symbolic arbitrariness, meaning representation and non-metaphorical meaning; the second stage was from the 1980s to the late 1990s, known as the second-generation cognitive science, which believed that the essence of the mind came from the experience of the body (Eberhard-Moscicka, Jost, Raith, & Maurer, 2015), so the embodied mind, the cognitive unconsciousness and the metaphorical thought became its philosophical views; the third stage began in the early 21st century, known as the third-generation cognitive science, which uses advanced brain imaging technology and computer neural simulation technology to interpret the complex relationships between human's cognitive activities and language abilities and their cranial nerves, and to reveal the secrets about the advanced functions of the human brain (Putkinen, Tervaniemi, Saarikivi, & Huotilainen, 2015). With the adjustment and optimization of the educational structure of colleges and universities, the public English course will definitely undergo a series of adjustments and reforms in terms of curriculum objectives, teaching content, teaching methods and teaching evaluation so as to meet the needs of postgraduate education reform and talent training. The college English course is designed to "make students master English as a tool to conduct research and international exchanges in the relevant disciplines". However, there are still many problems in the current English teaching, mainly reflected in the English academic writing, speech and peer exchanges. In order to solve this problem, this paper explores the source problems of English teaching in colleges and universities from the perspective of neurocognition and puts forward suggestions for future reforms, with a view to improving the English skills of college students in the future.

English Learning in the Perspective of Cognitive Neurology

The development of neurocognitive fields

In the 1950s, a "cognitive revolution" took place in Europe and the United States, giving birth to a new discipline - cognitive science, which intends to study the human mind and its processes from sensory perception to thinking information processing, including those from sensory input to complex problem solving, the intelligent activities of individuals ad the whole human society and the nature of human intelligence and machine intelligence. In the 21st century, cognitive science entered its third stage and attempts to interpret the complex relationships between human's cognitive activities and language abilities and their cranial nerves using advanced brain imaging technology and computer simulation technology, which is also known as the neurocognitive science (Brown, Willett, Goldfine & Goldfine, 2018). Human's neural activity is a biochemical process. The language-related neural activities provide relevant content and research areas for the research on neural simulation of languages.

In cognitive neuroscience, people study the cognitive neural simulation through mirror neurons. In 1996, an Italian neuropsychologist Rizzolatt discovered that primates have mirror neurons with simulation capabilities that are activated not only when they perform actions, but also when they observe others performing the same actions. The simulation process is shown in Figure 1.

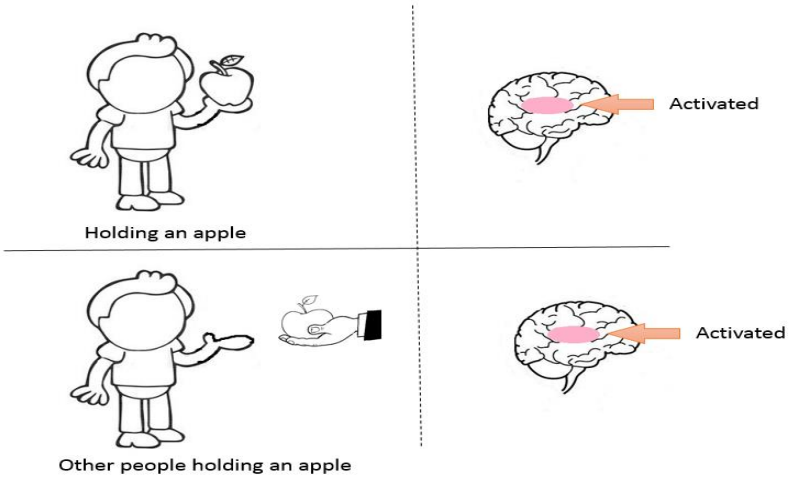

Figure 1. Mirror neurological simulation.

In human's mirror-neuron system, the division of labour is more explicit, flexible and highly evolved, which involves not only actions and intentions, but also languages and emotions.

The Application of Metacognitive Strategies in Listening Teaching

Metacognition refers to the subject's cognition of his/her own cognitive activities. Researchers believe that metacognition includes not only the subject's cognition of the current cognitive process (dynamic) and his/her own cognitive ability (static) and the interactions between the two, but also the cognition of his/her own psychological state, abilities, goals and strategies and the planning, monitoring and evaluation of his/her own cognitive activities. Take listening teaching for example. Its main objective is to understand the material, and understanding itself is a process of neurocognition. Using metacognitive strategies can significantly improve students' metacognitive knowledge. Table 1 compares the experimental abilities of Hu Zhihai and other college students, which confirms this point.

Table 1
Experimental Comparison of Metacognitive Ability

SPSS 10.0		Metacognitive knowledge		Metacognitive experience		Metacognitive strategies	
		M	SD	M	SD	M	SD
Test group (65)	before	62.5	8.4	59.6	8.2	58.4	9.6
	after	63.0	8.8	64.8	9.2	59.5	9.5
Control group (72)	before	61.2	8.3	60.6	8.6	58.5	10.9
	after	52.3	9.0	61.7	9.0	57.9	10.5

It can be seen that language acquisition is a neurocognitive activity involving continuously inputting, processing and outputting information. Learners often use various metacognitive strategies to understand and

analyze the input information to ensure the correctness and feasibility of their understanding. The metacognitive strategies applied in listening teaching consist of three steps: call prediction, compliance monitoring and balance adjustment strategies.

The neurocognitive mechanism of mother tongue acquisition

The human brain is the physical carrier of language learning. In an infant brain, the connections and circuits between nerve cells are constantly expanding and correcting under language stimulations, but in an adult brain, the connections and circuits between nerve cells are relatively stable. Being in the formatted native language pattern, adults find it hard to naturally expand and correct themselves when receiving new language materials, especially when the language is not in the same system with their mother tongue. Children can learn a language more easily because their brain nerve cells do not form a fixed language pattern. When the language materials are repeatedly received, the brain's nerve cells are activated, leaving deep impressions. Over time, a fixed language pattern will be formed. Figure 2 shows the typical process of how neuronal connections are established during language acquisition. However, it is very difficult for adults to use the second language without thinking. In a brain carved with the mother tongue pattern, it is very difficult to establish neural connections for new grammatical and linguistic rules Therefore, many advanced English learners may still make simple grammatical mistakes when they are speaking, even through they are already familiar with the grammatical rules in their brains.

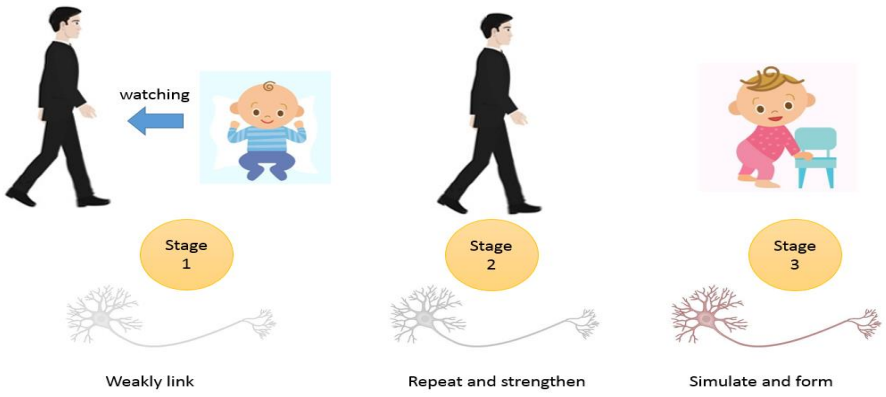

Figure 2. Language acquisition neuron establishment process.

The Necessity of Teaching Reform of Public English Courses in Colleges and Universities

In the context of the accelerating globalization process and the college enrollment expansion policy, college students are facing a severe employment situation, so corresponding curriculum reform is very necessary (Alrashidi & Phan, 2015). In addition, college students also need to master academic English if they want to be engaged in scientific research (Kirby, Burnside, Bretsztajn, & Burke, 2015), so it is imperative to carry out

reform in the training of international talents. The following paragraphs point out the specific issues in the current college public English course teaching and propose appropriate reform recommendations.

Analysis from the employment situation

Figure 3 shows the employment rate of college students from 2001 to 2010 in China. It can be seen that the employment rate began to decline significantly after 2005, partly because of the rapid increase of college students in China and partly because of the reduction of jobs and great competitive pressure. Improving the English teaching level is one of the main ways to improve employment.

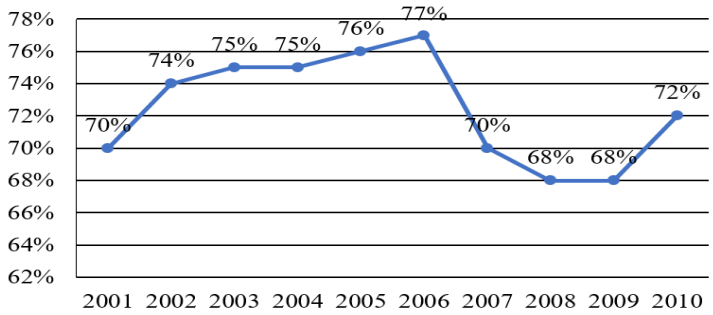

Figure 3. Graduate Employment Statistics.

Through investigation of the current situation of English teaching in colleges and universities, this paper proposes appropriate solutions to the existing problems, as shown in Figure 4.

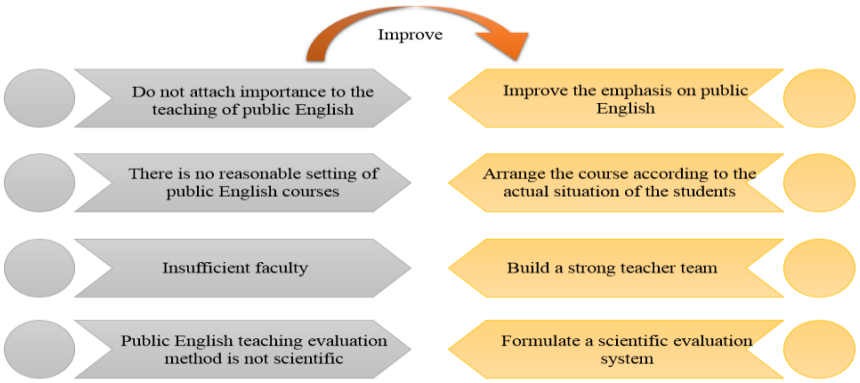

Figure 4. Problems and Countermeasures in College English Teaching.

Analysis from the perspective of effective teaching

At present, “effective teaching” can be defined from two aspect: one is the cost and gain of teaching; and the other is whether the learning motives of students are satisfied (Bradforth Stephen et al., 2015; Obraztsov,

2008; Yusuf, Olufunke & Valentine, 2015), of which the latter is chosen in this paper as the criterion for the effectiveness of the course as this study attempts to explore the reform of the postgraduate public English course based on the learning effects of students. Obviously, the students' motives are to gain knowledge or master it well. If the students do not get any improvement through course learning, it will be considered as ineffective teaching no matter how much time and effort the teacher has put into it. Therefore, "effective teaching" refers to all behaviours and strategies that teachers use to cause, maintain and promote students' learning, including the following four aspects: arousing students' interest in learning, that is, the teacher should make the students "motivated, willing and ready to learn"; setting clear teaching objectives, that is, the teacher should help and guide the students in understanding "what and how much they want to learn"; adopting teaching method that students can easily understand and accept; and using scientific and reasonable curriculum evaluation forms to objectively and accurately reflect the learning process and effects of the students.

In response to these problems, a public English course reform scheme has been proposed from the perspective of effective teaching. The specific content is shown in Figure 5.

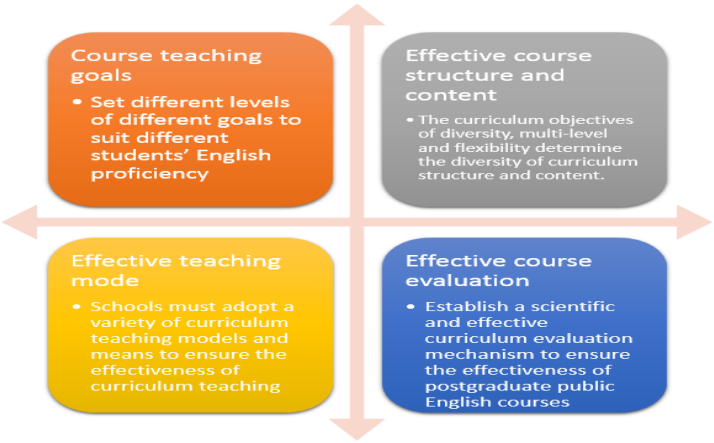

Figure 5. Public English Curriculum Reform under the Perspective of Effective Teaching.

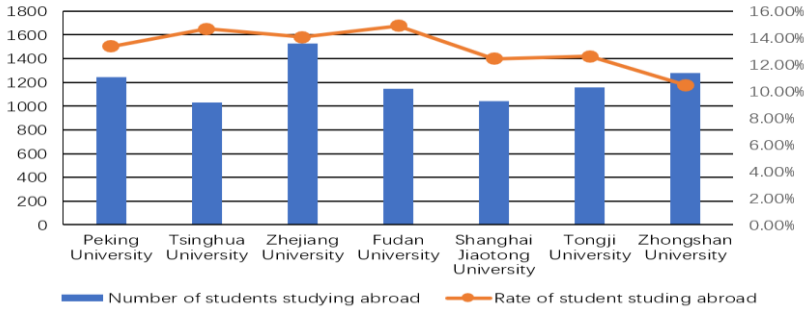

Figure 6. Some college graduates studying abroad in 2015.

Analysis from the perspective of training international talents

In recent years, there have been more and more Chinese students studying abroad Figure 6 shows the statistics of the numbers and proportions of students going abroad from various universities in 2015. It can be seen that international talent training is one of the important tasks for top universities, so English teaching is very important.

Teaching Reform Strategy Driven by Native Problems in the Perspective of Neurocognition

As a language, English is a tool that people use to think and transmit information and also an important carrier of culture, so culture and communication are the source problems of English teaching. Based on this, this paper proposes the following reform strategies:

Adopt the penetrated learning strategy and learn how to learn

As the saying goes, “it is better to teach a man how to fish than to give him fish”. Guiding students on the learning methods and allowing them to learn independently is an important way to improve their learning efficiency.

Cultivate cross-cultural awareness and broaden horizons

Language cannot exist without culture. Therefore, understanding the cultural differences behind the language and understanding the source problems in language learning is an important method for in-depth and effective teaching.

Explore the humanity in English articles

A good language can give people enjoyment. In English teaching, students should be guided to enjoy the spiritual pleasure brought by the English articles so that students will want to actively and persistently explore the beauty of language.

Conclusion

Cognitive activity is the process of information processing and neural construction in the human brain. With the development of the times, English teaching has been playing an increasingly important role in education. From the perspective of neurocognition, this paper explores the source problems in English teaching and proposes some reform recommendations for the college public English course, which provides the direction for the future reform.

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