

Cognitive Learning theory and Its Application in English Teaching

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ABSTRACT. *Cognitive learning theory explores learning rules by studying human cognitive process. This article attempts to introduce some of the important cognitive learning theory and states how cognitive learning theory is applied in English teaching.*

KEYWORDS: *Cognitive learning, English teaching, English learning*

1. Introduction

Cognitive learning theory originates from Gestalt School's cognitive learning theory. Since the mid-1950s, with the creative work of a group of cognitive psychologists such as Bruner and Ausubel, the study of learning theory has entered a glorious period. Cognitive learning theory has begun to occupy a dominant position in the study of learning theory.

Cognitive learning theory holds that learning is not a simple connection between stimulus and response, but the active formation of new cognitive structures by learners. The following parts of the article will focus on Jerome S. Bruner's cognitive structure learning theory, Ausubel's meaningful learning theory and Gagne's information processing theory.

2. Cognitive Structure Learning Theory

2.1 Cognitive Growth and Representation Theory

Bruner equates wisdom growth with cognitive growth, and regards them as the process of forming a representation system, which is a set of rules for people to perceive and understand the world. He believes that the growth of wisdom aims to provide students with a real-world model through which students can solve problems in life. In the growth period of human intelligence, action representation, image representation and symbolic representation work together. They refer to understanding things through movements or actions, portraits, images and various

symbols respectively. In the stage of action representation, children learn and reproduce things by acting on them, and then reproduce the past things through appropriate movement response. In the stage of image representation, children begin to form images or presentation to show what they find in the world. In the symbolic representation stage, children can reproduce their world through symbols, of which language is the most important symbol.

2.2 Categories and Their Coding Systems

People interact with the environment according to categories or classification systems. If people want to go beyond direct sensory materials, they should not only classify sensory inputs into a certain category, but also make inferences according to this category and other related categories, which constitute the coding system, which is a group of interrelated and non-specific categories and serves as a way for people to group and combine environmental information. An important feature of the coding system is to arrange the relevant categories in a hierarchical structure. The higher-level categories are more general and the lower-level categories are more specific. Learning is the formation or change of categories and their coding systems, the formation or change of cognitive structures, and the process in which a person connects similar things and gives them meaning.

2.3 Discovery Learning

Discovery learning aims to cultivate an exploratory mode of thinking of students, and the learning content should be discovered by students themselves. Discovery refers not only to seeking things that human beings do not know, but also to all forms of acquiring knowledge in person; it is to reorganize or transform the phenomenon to gain a new understanding no matter what discovery it is. It is found that the functions of learning mainly include the following. First, learning helps to improve learners' potential of intelligence because in the learning process they learn how to transform and organize information and put forward their own exploratory mode to solve problems. Second, learning helps maintain and retrieve information. Materials organized according to an individual's cognitive structure are most likely to be in and out of his memory freely. Third, learning helps transfer external rewards to internal motives. Learning a concept or principle by finding the relationship between examples can arouse students' satisfaction of success. It is less important to understand general principles than to cultivate an attitude-- to explore new situations, make assumptions, speculate on relationships between things, solve new problems or discover new things.

3. Meaningful Learning Theory

3.1 Types of Meaningful Learning

Ausubel pointed out that the essence of meaningful learning is that the new knowledge represented by symbols establishes a substantial connection with the existing concepts in learners' cognitive structure. Meaningful learning is divided into the following four types: 1) Representation learning, which means learning the meaning of various symbols, and the mental mechanism of representation learning is that symbols and the things or concepts they represent establish corresponding equivalence relations in learners' cognitive structure; 2) Concept learning, which means grasping the common key features of similar things, and these features can be independently discovered by learners from a large number of different examples of similar things, or be directly presented to learners by definition; 3) propositional learning, which means understanding the meaning of the sentence (proposition). Propositions are expressed in the form of sentences and can be divided into two categories: non-generalized propositions and general statements. The former only represent the relationship between two or more special things, and the latter express the relationship between several things or properties or concepts; 4) Discovery learning, which means that the learning content is not presented to students in a final way, on the contrary, students are required to engage in some psychological activities, such as reorganizing or transforming the learning content before incorporating the final results into their cognitive structure.

3.2 The Psychological Mechanism of Meaningful Learning

Ausubel believes that assimilation is the psychological mechanism of meaningful learning. Meaningful learning occurs through the interaction between new information and the existing related concepts in students' cognitive structure. Assimilation enhances the retention of knowledge in three different ways: 1) the existing related concepts are taken as fixed points, so that they can become highly stable and accurate concepts in the cognitive structure and make new knowledge share this stability and obtain new meanings; 2) in the storage phase, since new knowledge has always maintained a substantial connection with the existing concepts, the concepts which play a fixed role can prevent new knowledge from being interfered by the past knowledge, current experience and similar concepts encountered in the future; 3) new knowledge is stored in the relationship with the related concepts in the cognitive structure, which makes information extraction a more organized process.

3.3 Organizational Principles of Meaningful Learning

Meaningful learning should follow the following two organizational principles: 1) the principle of gradual differentiation, which means that students should first learn the most general concepts, and then gradually differentiate them according to

specific details. This order of presenting the teaching content is not only consistent with the natural order of human acquisition of cognitive content, but also consistent with the way knowledge is represented, organized and stored in human cognitive structure; 2) the principle of integration and coordination, which is about how to recombine the existing elements in students' cognitive structure- in other words, it is also a form of gradual differentiation of cognitive structure in meaningful learning.

4. Information Processing Learning Theory

4.1 Information Processing Mode

Gagne regards human learning process as information processing process and puts forward learning and memory models. He regards the learning process as a process in which the processing system, the executive control system and the expectation of information cooperate.

The processing system is also known as the "operating system". The stimuli from the environment act on the receiver, which transmits the received information to the sensory register. During this period, only a small part of information is noticed and selected and is able to enter short-term memory for processing. The short-term memory has very short storage time and an extremely limited capacity. Long-term memory retains information for a long time and has a large storage capacity. Only by repeating the information continuously can it enter the long-term memory from the short-term memory. Extracting information stored in long-term memory forms the basis of "reaction occurrence".

The executive control system is not directly connected with any operating component but directly related to people's metacognition and regulates and controls the whole processing system. The executive control system enables the sensory system to select appropriate information for attention, guides the selection of information processing methods in short-term memory, guides the selection of representation forms in short-term memory and long-term memory and guides the selection of knowledge extraction clues in long-term memory.

The expectation of information is the motivation system of the information processing process; it plays a directional role in the processing process and affects the learners' efforts and concentration. If the learner has a high level of motivation to achieve the predetermined goals, he can concentrate on them and choose effective learning strategies for them, and the realization of his learning objectives may give him a sense of accomplishment and he will devote more time and attention to the next learning activity.

4.2 Information Processing Process

The process of information processing includes three stages: attention to stimulation, stimulation coding, and information storage and extraction.

In the first stage, learners receive stimuli from the environment to activate the receiver, which converts the stimuli into neural information. The information coming from various sensory organs is more or less registered in a complete form and only stored here for about one second or a fraction of a second. This sensory representation component should be the object of attention for a long period of timewhile the rest will disappear and no longer affect the nervous system.

In the second stage, the converted information immediately enters the short-term memory, where the information stays for a limited time-generally believed to be about 20 seconds. Information is stored in auditory and vocal forms. The capacity of short-term memory is limited; once this capacity is exceeded, the old information will be “squeezed out”. In order to keep the information in long-term memory, further processing is needed, which is called coding. There are two main coding strategies: maintenance rehearsal and elaborative rehearsal. Maintenance rehearsal means repeating the information to be memorized, such as reciting the text. Elaborative rehearsal means that information is converted in some way and changed so as to be connected with the stored information; it can be replaced by other symbols, and some other information can also be added to be memorized. In the third stage, information is stored in encoded form in long-term memory. The storage in long-term memory is permanent and will not disappear with the passage of time. However, the stored information may not be extracted due to some factors, such as interference between new and old information that needs to be memorized. The extraction process requires certain clues, which can be provided by external situations or learners. Usually, when the extracted information returns to short-term memory, the acquired materials become easy for learners to use; they can be combined with new input materials or activate the reaction generator to be transformed into explicit behaviors.

5. Application of Cognitive Theory in English Teaching

The cognitive school believes that cognitive development is the foundation of language development, that language development is an organic component of cognitive development, and that language ability is one of the aspects of individuals' cognitive ability and the product of interaction between subject and object. Language develops with the development of cognition, and it does not appear until the cognitive structure develops to a certain degree. Language development is constrained by cognitive development. At the same time, the production of language plays a great role in promoting the development of cognitive ability. On the one hand, language enables people to exchange ideas and information; on the other hand, language can help people better understand new things.

Language is a creative activity which is dominated by rules. Language learning is to master rules and construct meanings. It involves the extraction of vocabulary and the selection of grammatical rules. Learners are required to make assumptions about the language structure they have learned, make judgments, and prove whether the assumptions are correct or not according to new language input. Cognitive psychology emphasizes that foreign languages should be practiced on the basis of

understanding language knowledge and rules in order to acquire language ability. It advocates that learners' intellectual role should given full play in second language teaching and that learners can understand, discover and master language rules through conscious learning of pronunciation, vocabulary and grammar, so that they can master the language they are learning from the perspectives of listening, speaking, reading and writing.

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