

The Application and Research of Mind Map in Circuit Course

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Abstract. The principle of circuit is the basic course of electronic and electrical information in Colleges and universities. Based on the author's teaching practice and experiences, an efficient circuit teaching and learning method of Mind Map is studied. Mind Map methods use in three different parts, the content of the curriculum system, dynamic circuit analysis and node voltage, and show the relation between knowledge and thinking process, guide students to study independently. Practice shows that using this method to make the teaching idea clear and enable students to turn from passive acceptance to active thinking, thus greatly improving the teaching efficiency and effectiveness, and achieving the effective teaching goal for students well to learn, like to learn and easy to learn.

Introduction

The Circuit course is the basic course of the electronic and electrical information specialty of the University, it is the required course of all Strong and Weak electricity major [1]. Along with the implementation of information technology and modern teaching engineering, based on the characteristics of circuit course, how to improve teaching methods and students' interest, put forward new challenges to college teachers. The key to the success is to keep forging ahead and innovating in the teaching practice.

The system of circuit courses is relatively complete, with the large reduction in the curriculum hours, the higher requirements for the reform of the course teaching are put forward. At present, the direction of the teaching reform of the circuit curriculum is mainly focused on the teaching methods and means [2]. Through the teaching practice in recent years, I have been expecting a breakthrough in the teaching method of the circuit course. Until I saw the book of Mind Map, it give me a lot of inspiration in the teaching.

Mind Map Introduction

Mind map, also known as "mental map" or "brain map", is invented by the father of memory in the United Kingdom, brainpower development expert Toni Tony (Tony Buzan). It is a way to maximize the efficiency of human brain. In essence, it is repeating and imitating the divergent thinking, which in turn amplifies the brain's instincts and makes the brain more powerful [3]. Mind Map is everywhere, using the mind map, the ability to learn and a clear way of thinking, will improve the behavior of people [4].

Tony Buzan believes that the Mind Map has 4 basic features [5]:

- (1) The theme of the research should be clearly and centrally reflected on the central image;
- (2) Take the central map as the center, and the main trunk of the subject is radiating around;
- (3) The branch is made up of a key image or key word, and the less important topic is attached to a higher level branch;
- (4) All branches form a connected node structure.

Usually, Mind Map can be drawn by hand or can be drawn by proprietary computer software, such as Mind Map, etc., but the rendering process basically follows the following steps [6]:

- (1) Determine the theme or center of the Mind Map;
 - (2) Establish the relationship between the central image and the main branches, and then draw the second level branches of the main branches and the third level branches of second level branches according to the need, and so on;
 - (3) The key words are usually tagged on the connection;
- In the drawing process, the Mind Map can be combined with the corresponding text, to highlight expresser's meaning, in order to emphasize the differences between the central theme or key words and branch keywords, can also use different colors and different graphics to display.

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Problems in Circuit Teaching

According to the teaching practice and research, we find that there are some problems to be solved in the course of circuit teaching.

The Content is Relatively Large, and the Level and Context of Knowledge are not Clear Enough. At present, circuit courses usually include "DC circuit", "dynamic circuit", "AC circuit" and so on, a lot of details are derived from each of these pieces. The multi-points knowledge and the isolation between the various knowledge points lead to the lack of clarity of the course. Besides, our circuit course is set up in the second half semester of the first grade. This semester's courses include advanced mathematics, college physics and so on. These courses are relatively hard to learn, so students generally feel that learning of circuit courses is very difficult.

Pay Attention to the Completeness of Mathematics. The circuit teaching is basically based on two kinds of constraint relations to analyze the circuit. Therefore, it often focuses on the column writing and solving of equations, and pays attention to the completeness of mathematics, and put forward very high mathematical requirements for students. In fact, most students have forgotten the relevant mathematical knowledge. Under these circumstances, how to better finish circuit teaching is a big problem.

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How to apply a mind map to a circuit course includes the following steps.

The Introduction of Mind Map to Teaching. First of all, students should understand the concept of Mind Map by consulting relevant information. Secondly, in the course of teaching, teachers use Mind Map as far as possible for teaching design and preparing lessons. For more concepts and more difficult to understand, various ways, such as blackboard or projection, are used to guide students to understand and review.

Teaching Case. We introduce the Mind Map into the circuit teaching. Dynamic circuits need to establish first-order linear constant coefficient differential equations. However, only a few students have impressions. In addition, coupled with the analysis of equations and circuits, which further increases the difficulty. However, by drawing mind map, as shown in Figure 1, we can make the knowledge points and the internal relations between equations and circuits appear incisively and vividly, and then grasp the physical essence of circuits, and weaken the difficulty of solving the first order differential equations in mathematics.

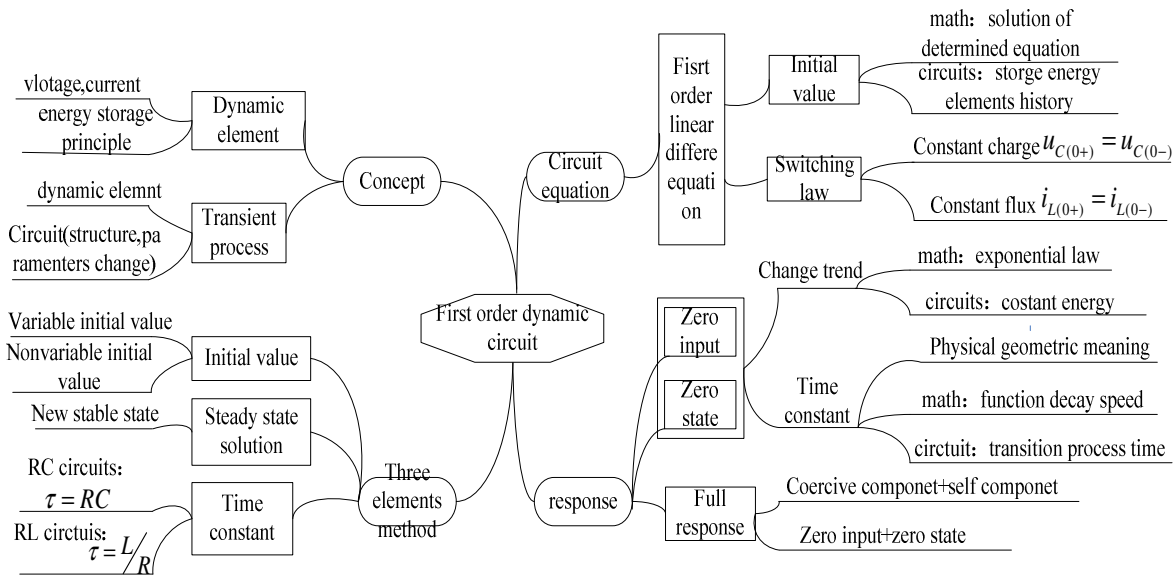


Figure 1. First Order Dynamic Circuit Mind Map.

With the progress of curriculum, we can not only link knowledge points, show the way of curriculum content organization, but also set up a general framework through Mind Map course, quickly establish the overall concept, and effectively organize curriculum context.

Summary

In this paper, Mind Map is applied in teaching case of first-order circuit, and expand students knowledge, so as to gradually establish the relationship between isolated knowledge points and clarify the context of curriculum. With the help of effective expression of mind map, we weaken the process of mathematical deduction, emphasize the physical characteristics of circuits, regress the essence of circuit courses, and stimulate students' interest in learning.

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