

On the Teaching Function of Conceptual Map in Chemistry Teaching in Senior Middle School

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Abstract

The new edition of the New Curriculum Standard for Chemistry in Senior High School in 2017 was officially issued by the Ministry of Education of China. The new "Chemistry course Standard of General Senior Middle School" clearly puts forward the "training of senior high school students' chemistry thinking and practical ability". The chemical thinking here mainly refers to the comprehensive thinking ability to absorb and integrate the chemical concepts and related theories. However, the cultivation of this comprehensive thinking ability requires chemistry teachers to develop their thinking ability of comprehensive analysis step by step by adopting certain classroom guidance skills to maximize the chemistry core literacy of high school students, the author thinks that one kind of education method that is more suitable for senior high school chemistry teachers at present is concept map. The theoretical source of concept map is the schema theory in language teaching. The theory emphasizes the cultivation of students' ability of inductive reasoning or deductive reasoning through the form of conceptual mapping indeed. The core of this paper is to try to cultivate the "comprehensive thinking ability" of high school students through the guidance of concept map so as to promote the teaching efficiency of chemistry teaching.

Keywords

High school chemistry; Conceptual Mapping; Teaching function; Thinking cultivation.

1. Introduction

The core purpose of chemistry teaching in senior high school is to cultivate the ability of chemistry learning and the quality of chemistry thinking and to realize the comprehensive accomplishment of solving a series of chemical problems with the help of chemistry theory study and daily experiment operation. In the whole students' learning activities, teachers' inspiration and guidance and the construction of students' autonomous learning strategies as well as the cultivation of chemistry learning motivation mainly depends on whether chemistry teachers pay attention to the sequence and hierarchy of teaching contents in the classroom teaching design. With more attention paid to the cultivation of students' thinking quality, more and more chemical educators begin to focus on the cultivation of students' thinking ability in classroom learning. Therefore, this concept map is also gradually introduced into the chemistry classroom teaching of senior high school, which provides abundant inspiration for the design of teaching activities for the majority of senior high school chemistry teachers to cultivate the students' theoretical memory habits and the mode of thinking development. In view of this, this paper tries to explore the teaching function of concept map in senior high school chemistry teaching.

2. Core Concept Interpretation

2.1. High School Chemistry New Curriculum Standard (2017)

The 2017 version of the New Curriculum Standard for Chemistry in General Senior High School is a revised version of the "2003 edition of the General Senior Middle School Curriculum Standard (Experimental Edition)", which is revised by numerous educational scholars and subject experts in the field of basic education of the Ministry of Education. The latest curriculum standards, which discusses the integration of "high school chemistry teaching" idea and core education idea of the new college entrance examination model in the future from the perspective of chemistry teaching idea, classroom teaching suggestion, talent training specification of curriculum standard and concrete teaching implementation opinion.

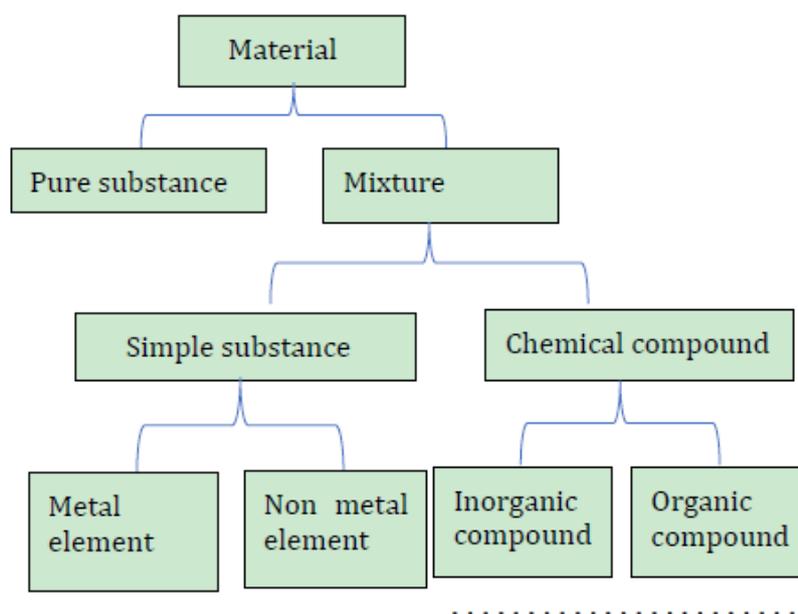
2.2. Conceptual Mapping

The concept map is introduced from the western psychological education expert Osobel. It is a graphical method of representing the concept with nodes and expressing the conceptual relationship through the connection and junctions. The core idea of the concept map is to integrate the points, lines, surfaces and other auxiliary drawings between the points, lines, surfaces and other auxiliary drawings of the knowledge to be learned by the students, which is similar to the schemata of the mind map. This schema can form a network of knowledge in the learner's brain to help learners construct a logical relationship between existing knowledge and new knowledge so as to optimize the efficiency of memory and cognition, its theoretical core is still inseparable from Ausubel's theory of knowledge construction.

3. Application of concept Map in Chemistry Classroom

3.1. Application Cases of Chemical Substances and Their Changes

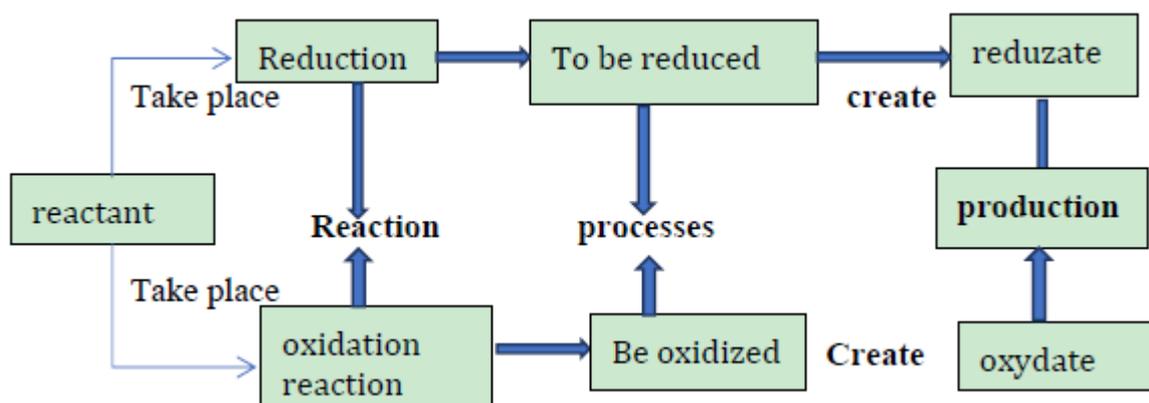
Chemical substances and their Classification are important chapters in the basic study of Chemistry Teaching in Senior High School, the study of this chapter is an important chapter for students to learn basic chemical concepts and to understand chemical substances and their classification. In order to form a systematic chemical concept in the brain of senior high school students, the concept map can be used to optimize the students' thinking cognition and improve their memory quality and understanding ability. For instance, the example below:



The above concept map can deepen the understanding through concrete examples after high school students grasp the basic core of these concepts. Then the teacher can make use of multimedia to construct a concept map suitable for students' memory. The above concept map is an organic link between the content of the chemical substance and the classification of the chemical substance, the node and the line, as well as the box. Finally, through the concept map, the students can divide the concepts into several parts with their own understanding layer by layer. Finally, the concept is arranged in their minds with certain logic, which enhances the effect of memory, and also ensures the accuracy and clearness of the concept learning.

3.2. An application Case of Redox Reaction

Redox reaction is a very important part of high school compulsory study. Learning about oxidation and reduction reaction is very important for students to know more about industrial and chemical production. And redox reaction has very important value to the contribution of human life. But according to the pure theory explanation and then transition to the formula, finally use the teaching experiment to verify the chemical reaction teaching model is easy to let the student have the pressure, not easy to understand the knowledge deeply, and easy to forget, but after learning all the knowledge points, if we can design a concept map that is full of characteristics through the students' inquiry and the teacher's prompt, we can help the students to straighten out the knowledge points and more clearly divide the levels. In order to train their linear thinking and reverse thinking, after a lot of practice to form a comprehensive thinking.



The above concept diagram of redox reaction, from the condition of redox to the process of occurrence and the product of different stages, is logically processed. The arrow and square frame, as well as the whole frame structure, well reflect the essence of the redox reaction. It also interprets the core idea of this knowledge, and it is helpful to integrate the students' thinking and make them understand the relationship between the various parts of the concept map.

4. The value function of concept Map to Chemistry classroom in Senior Middle School

Through the excavation of the core literacy of the concept map, through its theoretical sources and effective application in chemistry teaching, although there are only two simple chapters of the application of high school chemistry cases, But it can fully excavate the value function of "concept map" to high school chemistry classroom teaching:

4.1. It Is Helpful to Concretize the Study of Chemistry Theory in Class

Figurative is a literary term, but it is selected from objective objects in life. Chemistry is as vast as the sea of clouds. For some theoretical studies, if we only read and analyze them one by one according to the textbook arrangement, the longer the time goes, the looser the students' focus will be, and the more fatigue they will experience. But if the chemistry teacher can use the concept map to construct the loose logic unclear knowledge points according to the characteristics of the subject knowledge, such complicated things can be simplified. Students can well understand the concept map from big to small, from rough to fine knowledge system, because the concept map has always used nodes to show the relationship between different knowledge elements, to achieve the clarity of classroom conceptual understanding.

4.2. It Helps Teachers Optimize Classroom Teaching Content and Improve Teaching Efficiency

The new curriculum tells us that the new chemistry class in high school should be fun and challenging, which is different from the traditional classroom that is full of irrigation, In order to optimize the complicated knowledge and the content of the teaching material systematically, the whole theory knowledge and the practical procedural knowledge should be presented on the blackboard with the ingenious concept map. Then according to the needs of the students, the classroom teaching activities are well designed. This kind of chemistry teaching will achieve twice the result with half the effort, will accord with "the core accomplishment idea, accords with the modern society many high school education expectation".

4.3. Multi-Angle Helps Teachers to Cultivate the Thinking Quality of High School Students

The 2017 edition of the New Curriculum Standards for Senior High School Chemistry fully demonstrates the "core value of the cultivation of thinking quality in the training of senior high school students' chemistry comprehensive ability". If the students' chemical thinking quality is not developed, the knowledge learning, life practice ability and sustainable development will be seriously affected. So the chemistry teacher must be good at making use of modern information media technology to design colorful "concept maps, so that they can serve teachers and students very well. "The design of the concept map requires that the chemistry teacher be very familiar with the knowledge system of a certain chapter, and that the chemistry teacher be very familiar with the students' knowledge. To understand the important and difficult points of knowledge in this chapter, then carefully design the concept map, train the students' analytical thinking, integrated thinking, reasoning thinking and logical thinking through activities such as teacher-student cooperation, student self-design, teacher modification, etc. Over time, students can form their own learning strategies, or they can apply the concept map to the preparation of notes as they prepare for new classes and review their knowledge.

5. Conclusions

Starting from the intension requirement of the 2017 edition of the New Curriculum Standard for Chemistry in Senior High School, this paper draws out the importance of the cultivation of students' thinking quality to the cultivation of comprehensive chemistry ability of senior high school students, and the theoretical origin and main contents of concept map are discussed in detail. Then the effective application of concept maps is explored from the two knowledge systems of classroom teaching. Finally, according to the above discussion, the teaching value and function of concept maps in high school chemistry classroom are discussed from three aspects, and the purpose of this paper is realized.

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