

Effective Physics Teaching Based on Mind Mapping

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Abstract. This paper mainly studies the characteristics of mind mapping and analyzes the advantages of applying mind mapping to solve the shortcomings of current university physics teaching. The application prospect of mind map as an effective graphical thinking tool in college physics teaching is studied.

The Introduction to Mind Map

Mind map is an effective graphical thinking tool for expressing divergent thinking. It is simple but effective and is a revolutionary thinking tool. Mind maps can use the skills of both maps and words to express the relationship between the various levels of the subject with the related hierarchical maps, and establish the memory links between the topic keywords and images and colors.

We know that radioactive thinking is the natural way of thinking about the human brain. Whether it is feeling, memory or thoughts and thoughts, you can visualize this kind of thinking we can expressed through a mind map. On the means of expression, words, numbers, codes, aromas, food, Lines, colors, images, rhythms, notes, etc. can all become a center of thinking, and the center emits thousands of joint points outward, and each joint point can serve as a new center of thinking, showing radioactivity. The three-dimensional structure, and the connection of these joints can be regarded as human memory, just like the neurons in the brain, which is the personal database of people. Therefore, mind maps, also known as brain maps, mental maps, brainstorming diagrams, concept maps, tree diagrams, or mind maps, are an image-based thinking tool and an image-based thinking aid. .

The Development Status of Mind Maps

The founder of the mind map is Tony Bozan, known internationally as Mr. Brain. As of 1993, Tony Bozan has published twenty books, including nineteen monographs on the mind, creativity and learning.

Mind maps were introduced into China in the 1980s and were originally used to help students with learning difficulties to overcome the learning obstacles. Later, the thinking visualization research team grafted the superior characteristics of the concept map (proposed by Dr. Nowak from Cornell University, USA), knowledge tree, problem tree and other graphic methods, and at the same time integrated the thinking methods of structural thinking, logical thinking, dialectical thinking, and questioning consciousness, and the “mind map” is transformed into “discipline mind map”. Now "disciplinary mind map" has been introduced into more than 500 experimental schools nationwide.

The Prospect of Applying Mind Map in Physics Teaching

Mind maps have practical value in physics teaching, such as improving classroom efficiency, helping students integrate scattered knowledge, stimulating students' interest in learning physics, and cultivating students' divergent thinking ability.

First, I will conduct research on the students I teach. It was found that 95% of the students in the freshman stage of the school did not understand the mind map, and 5% of the students occasionally came into contact with the mind map of the mind map during the learning process, but there is no deeper contact with the mind-guided learning method. In short, most of our students have no contact with mind maps-based learning and teaching.

Then, according to the research on the status quo of students' learning physics, most of the first-year university students in our school are science students in the college entrance examination. But these students with physical foundations have regarded university physics as the most difficult subject, the people who are really interested account for less than 4%. Most students think that studying university physics is to lay the foundation for future professional learning. It is not really love physics to learn physics. Driven by such learning motivation, students pay attention to only how to test the final exam, what to test, how to pass, so students are not concerned with the methods of physics research and scientific thinking, but just do some physical exercises to cope with the exam. Such results will inevitably lead to students' inefficiency in learning, some students suffer from resistance and frustration, and even negatively disappointed with the physics discipline, resulting in a tired of learning. So that students have not been able to understand the most basic physical concepts through the study of university physics, not to mention the understanding of the physical framework and the advancement of scientific thinking. Faced with such a reality, based on the teaching mode of mind map, it is a good way to solve the current shortcomings of education. In combination with the mind map, the teacher can condense the 90-minute physical knowledge content onto a piece of paper during the teaching process, summarizing it into a colorful picture-the mind map. With it students can have a holistic knowledge framework structure physics and the links between chapters, so as to further learn the methods of physics research. So the mind map has great in university physics teaching. Practice space.^{[2][3]}

The Advantages of Applying Mind Mapping in College Physics Teaching

An important teaching goal of physics teaching is to enable students to form characteristic physics thinking and apply this thinking to the ability to solve different practical problems. The formation of thinking and the acquisition of skills need to be based on the two foundations of the formation of concepts and the internalization of knowledge. Foreign education researchers have found that "a very important part of thinking is the formation of concepts, the organization and classification of ideas in the mind." This can "activate students' memories related to this and help them to add new concepts to In their illustrations, to achieve better teaching results. Therefore, the establishment of knowledge structure can not only help us to enhance the memory of knowledge, but more importantly, it can become a very important means of training thinking. Therefore, in the teaching process, mind map can be used as an effective tool to open the brain potential of learners, which can significantly improve the efficiency of learning.^[1] The use of mind maps in physics teaching has begun to attract people's attention. How to use the mind map to conduct university physics more effectively, improve the effectiveness of learning, and improve the ability of students innovate independently has yet to be further explored.

References

- [1] Wen-Zhao Yao, the effective application of mind map in university physics teaching [J] Teaching Research 2015 (08)
- [2] Yu-Xiong Liu, Wang Fang, Application of Mind Mapping in Forming Physics Knowledge Architecture [J] Journal of Chifeng College (Natural Science Edition) 30(2)+
- [3] Cong Li, Xiao-Hua Yuan, Zhen-Hua Wang, Ling-Chun Jia, Ying-li Chang Application of Mind Mapping in Physics Teaching in Non-Physical Specialty Universities [J] Educational Modernization
- [4] Xiong-Shui Yang, Hai-Long Zhou, Discrimination of Concept Map and Mind Map Based on Subject Teaching [J] Teaching and Management 2018(03)
- [5] Shu-Yang Lin, why should we give the mind map "genetical genetics" - talk about "discipline mind map" and "mind map" [J]. China Information Technology Education. 2015(18)
- [6] Li-Xia Wei, Zhen Zhou, Analysis of mind map and concept map [J] Journal of Harbin University. 2013(03)
- [7] Yu Li, Yang-Li Chai, Han-Bing Yan, The Influence of Mind Mapping on Students' Academic Achievements——A Meta-analysis of the Application of International Mind Mapping Education in Recent Ten Years[J]. China Distance Education. 2018(01)
- [8] Guo-Qing Zhao, Discussion on the application of conceptual maps and mind maps to teaching important issues [J], Electro-educational Research. 2012(05)
- [9] Xiao-Wei Fan, Li-Li Liu, Analysis of the use of mind maps in classroom teaching for personal knowledge management [J]. China Medical Education Technology. 2008 (01)
- [10] Xin-Ning Pei, concept map and its application in science teaching [J]. Global Education Outlook. 2001 (08)