

Article

# Research on the Application of Information Technology in Chemistry Teaching in Senior High School

Ying Huang <sup>1,\*</sup> and Qiwen Zheng <sup>2</sup>

<sup>1</sup> Chongqing Songshuqiao Middle School, Chongqing, China

<sup>2</sup> Chongqing No. 1 Middle School, Chongqing, China

\* Correspondence: Ying Huang, Chongqing Songshuqiao Middle School, Chongqing, China

**Abstract:** With the rapid progress of network technology, information-based teaching methods have brought unprecedented vitality to senior high school chemistry education. Through the combination of information technology, a new science and technology, with chemistry courses, chemistry knowledge can be more vivid, teaching content can be enriched, students can be provided with a high-quality learning atmosphere, their emotional experience can be enhanced, and they can understand and absorb chemistry knowledge more deeply. Therefore, under the background of the new era, senior high school chemistry teachers should deeply realize that information technology has brought great opportunities to chemistry teaching, which can not only improve their information literacy, but also closely integrate information technology with senior high school chemistry, thus comprehensively improving the educational effect.

**Keywords:** information technology; high school chemistry; applied research

## 1. Introduction

With the continuous advancement of the new round of basic education curriculum reform, people pay more and more attention to the combination of information technology and classroom teaching. Therefore, senior high school chemistry teachers need to adapt to the demand of quality education, pay attention to innovating their own teaching methods, pay attention to cultivating students comprehensive ability and subject accomplishment, scientifically introduce information technology, improve chemistry classroom teaching, improve students learning enthusiasm and promote students all-round development. This paper deeply explores the practical application of information technology in senior high school chemistry teaching, and hopes to provide some innovative viewpoints and suggestions for senior high school chemistry teachers in teaching practice.

## 2. Application Significance of Information Technology in Chemistry Teaching in Senior High School

### 2.1. Help to Improve the Efficiency of Chemistry Teaching in Senior High Schools

In senior high school chemistry teaching, the use of information technology can transform the chemical concepts memorized mechanically and described by words into intuitive knowledge. For example, information technology can effectively show the microstructure of chemicals such as graphite and sodium chloride, thus helping students to deeper understand and construct the cognitive framework and chemical concepts of the microscopic world. For students, high school chemistry is not only a part of natural science, but also covers many chemical experiments. Through information technology, tools such as virtual experiments and PPT can be used, and chemical knowledge can become more vivid and concrete, which not only enables students to intuitively understand the

Published: 29 October 2024



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meaning of chemical knowledge, but also deepens their understanding of chemical knowledge, thus improving their learning efficiency.

### *2.2. Helps to Cultivate Students Core Chemistry Literacy*

The "General High School Chemistry Curriculum Standards" released in 2017 has changed the views and understanding of chemistry educators on chemistry education. This means that front-line teachers need to create a real teaching environment based on the latest chemistry discipline arrangement concept and system, based on the discipline characteristics of chemistry, and integrate information technology into it, so as to match it with students core literacy. In the teaching process, the efficient application of teachers has a vital impact on cultivating students core competencies. They can present microscopic chemical fields, establish abstract thinking modes, provide students with materials to understand conflicts, and emphasize the core position of chemistry in daily life and production. This approach not only helps students gain an in-depth understanding of the core of chemistry from microscopic, molecular and atomic perspectives, but also provides teachers with an opportunity to integrate information technology into the instructional design and assessment process from the core competencies of chemistry. Therefore, the core significance of educational informatization lies in using advanced technical means to realize the teaching tasks that teachers cant accomplish in the classroom. This includes applying information technology to a wider range of fields, making it more vivid, intuitive and visual, strengthening emotional expression, enlarging teaching details, improving teaching realism, and thus more effectively improving teaching effect. Through fineProper application of information technology can effectively organize the new classroom of chemistry, carefully design the teaching methods and tasks, so as to construct a comprehensive chemistry knowledge structure and further cultivate students core abilities.

### *2.3. It Helps to Cultivate Students Innovative Thinking in Chemistry*

The integration of modern information technology into senior high school chemistry education has produced a positive effect on the cultivation of students innovative thinking ability. On the one hand, modern information technology provides students with numerous learning resources, and at the same time, it also provides them with a rich and diverse learning environment. Using diversified tools such as virtual laboratories and simulation software, students can feel the real operation process in actual operation, which can not only enhance their practical skills, but also cultivate their independent thinking and problem solving skills. At the same time, modern information technology has greatly facilitated the communication and cooperation among students. By using various tools such as online learning communities, forums and real-time messages, students can interact with other students in real time and share their learning experiences and research results. In addition, based on real problem scenarios, various project research and scientific and technological competitions can also be carried out on the Internet, with the main purpose of cultivating students innovative thinking and teamwork ability. Therefore, integrating modern information technology into chemistry teaching can not only create a diversified learning atmosphere for students, but also stimulate their learning enthusiasm and cultivate their independent exploration and problem solving ability, thus promoting the growth of their innovative thinking.

## **3. Application Strategy of Information Technology in Chemistry Teaching in Senior High School**

### *3.1. Application Strategy of Information Technology in Chemistry Teaching in Senior High School*

With the wide application of information technology, the traditional oral and blackboard teaching methods have been changed into multimedia teaching, which makes the

teaching process more lively and interesting, and it is easier to attract students interest, thus enhancing their learning enthusiasm. For example, in the teaching of the course "Human Understanding of Atomic Structure" in senior high school chemistry, teachers generally introduce some common arrangement of electrons outside the nuclear, and these contents are relatively abstract. Therefore, at this time, senior high school chemistry teachers can use interest technology to dynamically display these abstract contents on multimedia, and display the atomic structure diagrams of elements 1 ~ 18 on the same screen, so that students can find their commonalities and stimulate students learning interest through the dynamic evolution of atomic structure. Teachers can use information technology means to show students a dynamic demonstration of the magnesium oxide generation process, let them ask questions after watching, and guide them to analyze this changing process according to the content of textbooks. This can help students realize more clearly that during the collision and fusion process of magnesium and oxygen atoms, the former loses two outer electrons, while the latter gains two outer electrons. So as to stabilize the arrangement structure of electrons outside the nuclear, and achieve the purpose of cultivating students core literacy of changing concepts and balancing thinking.

### 3.2. *Demonstrate Chemical Knowledge with the Help of Network Platform*

The integration of multimedia technology into high school chemistry teaching can make chemistry knowledge display in a more vivid and intuitive way, which not only enhances high school students enthusiasm for learning, but also deepens their memory and understanding of chemistry knowledge, thus improving the overall quality of teaching.

For example, when teaching the course "Ethylene and Organic Polymer Materials" in "Compulsory Book 2", teachers can use multimedia tools to help students gain an in-depth understanding of ethylenes properties, molecular structure, double bond formation, and the interaction mechanism between ethylene and other substances by creating vivid molecular model animations. Through this kinetic model, students can delve into the mysteries of chemical reactions at the microscopic level and gain a deeper understanding of the chemical properties of ethylene. Teachers can also show students the industrial manufacturing process of ethylene through video materials, and observe the modern chemical production technology, so that students can have a deeper understanding of the synthesis principle and process application of ethylene, and combine these theoretical knowledge with practical operation. This teaching method can make students more deeply feel the great value of chemical knowledge in daily production and life. Furthermore, to give students a deeper understanding of the wide range of applications of chemistry in materials science, teachers can utilize multimedia tools to demonstrate its structure and properties. By showing molecular structure models of common organic polymer materials such as polyethylene and PVC, students can better understand the formation mechanism and properties of polymers and combine the properties of different types of polymer materials with their applications. Therefore, in classroom teaching, teachersMultimedia tools can be used to deepen the understanding of the learned knowledge, so as to achieve the purpose of improving the teaching effect of chemistry classroom.

### 3.3. *Enriching Chemistry Teaching Methods with Micro-Course*

With the rise of the "Internet plus" era, high school chemistry teachers need to make full use of micro-lesson videos to enrich their classroom teaching content. Through this teaching method, students can gain a deeper understanding of chemistry knowledge, thus improving their learning ability.

Taking compulsory course 1 as an example, the core goal of the course "Classification of Matter" is to let students deeply understand the key role of material structure research in the progress of human civilization, and at the same time, it can cultivate students understanding of the endless conceptual understanding of material structure exploration during the teaching process of this course. The knowledge content involved in this part is

highly speculative. Therefore, teachers can use micro-lesson videos to show specific knowledge content to students, thus improving their exploration ability and understanding efficiency. For example, in the teaching process, teachers can show students the exploration and research process of human material structure through micro-lesson videos. This micro-lesson video shows historical events in the form of documentary. From 1811 when Avogadro first put forward the concept of "molecule", by 1900, the number of new materials obtained through chemical synthesis and separation methods increased rapidly, which made great contributions to human survival and sustainable development. By watching this micro-lesson video, students can have a preliminary understanding of the process of material research, and at the same time deepen their understanding of the exploration of material structure. This is a never-ending process, which allows students to deeply understand the importance and value of studying material structure, thus stimulating their learning interest and initiative. Next, teachers can use micro-lessons. The videos show students the importance of understanding the study of the structure of matter from a philosophical perspective, which helps to cultivate the mode of thinking in the discipline of chemistry. Under the guidance of micro-lesson video, students have a strong interest in the exploration of material structure, further improve their knowledge system, so as to master knowledge more effectively, enrich the course content, and enhance students' overall learning ability.

#### *3.4. Strengthening Systematic Teaching by Using Mind Map*

Mind mapping is currently a popular learning strategy, which integrates knowledge points with similar content in a variety of ways to memorize and understand in a focused way. With the widespread application of information technology education, teachers have a variety of teaching methods, such as videos, pictures and animation displays, which can show students the material changes and energy reactions in chemistry, thus deepening their understanding of chemistry. In addition, we can also construct mind maps in multimedia teaching resources, so that the knowledge acquired by students becomes more systematic and organized. For example, when teaching the course of oxygen structure, relevant high school chemistry teachers can use mind maps to strengthen the teaching of this course, and show the knowledge of the production process, structure and characteristics of oxygen, nitrogen and carbon dioxide in the form of a list to help students remember. The box mind maps can help students remember relevant knowledge points, making them clearer and less confused. In the process of creating mind maps, students can maximize the abundance of resources on the web and add pictures related to the topic up close, which helps them think deeper and master the basics of chemistry more effectively.

#### *3.5. Optimizing Chemistry Experiment Teaching by Skillfully Using Information Technology*

Senior high school chemistry experiment occupies a vital position in the whole senior high school chemistry education system, and its teaching effect will have a direct impact on the overall quality of senior high school chemistry education. In the process of chemistry teaching, teachers can use multimedia, VR technology and simulated chemistry laboratory to conduct experiments, which not only provides teachers with the opportunity to simulate chemistry experiments, but also provides students with the opportunity to conduct experiments in the classroom, thus achieving excellent teaching results. Simulation experiments can not only significantly improve students' learning effect, but also stimulate students' learning enthusiasm and further strengthen students' interest in learning. Introducing simulation experiments into high school chemistry teaching can create a safe learning atmosphere for students, and bring strong visual shock to students through the conversion of images and sounds, thus enhancing their learning results. In the teaching of the course "Ion Balance in Aqueous Solution", teachers can use projectors to demonstrate in front of the podium to help students understand various phenomena in the experiment more intuitively. During the demonstration, students can clearly observe that there are

bubbles between the cathode and anode, while at the anode position, there are yellow and green gases. The experimental results show that ammonia gas will be produced on the anode side, and after completing a chemical experiment, a phenolphthalein solution can be placed on the cathode, and it is found that it turns red and forms an alkaline substance on the cathode side. Therefore, in high school chemistry experiment teaching, relevant teachers can use projection method to show the whole process of the experiment, which will help to improve the teaching performance more effectively.

#### 4. Conclusion

In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved. In the teaching process of chemistry in senior high school, information-based teaching methods have been widely used. Teachers need to closely follow the pace of curriculum reform and constantly improve their ability in information technology. By using information-based teaching tools, students enthusiasm for learning can be stimulated, the sharing of teaching resources can be realized, the key points of teaching can be broken through, and the chemistry experiment teaching can be optimized. Only in this way can our curriculum design be more efficient and the teaching quality can be further improved.

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