

Exploration of Innovative Strategies in Chemistry Classroom Teaching Supported by Information Technology

Shuchun Dong

Baicheng Vocational and Technical College, Baicheng, China

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Abstract: This article mainly explores the application of information technology in chemistry classroom teaching and its impact on teaching. The article provides references for teachers and researchers in the field of chemistry education. The traditional mode of chemistry classroom teaching and the corresponding problems are analyzed in this paper. This paper proposes the use of information technology to expand teaching content and enhance the effectiveness of teaching. It utilizes the interactive role of information technology in classroom teaching. Further, it seeks to construct an evaluation system for chemistry classroom teaching supported by information technology, among other innovative strategies. The attitude of students towards chemistry classroom teaching supported by information technology is analyzed. Through practice, it explores the cases of chemistry experimental teaching and theoretical teaching supported by information technology. From this, a series of conclusions and shortcomings are summarized and directions for subsequent research are proposed. The conclusion of this paper indicates that information technology plays a significant role in chemistry classroom teaching. It can improve students' interest in learning, promote teacher-student interaction, expand teaching content, and enhance the effectiveness of teaching.

1. Introduction

1.1 Research Background

In the era of informatization, the application of information technology in the field of education is becoming more widespread. This is no exception for chemistry classroom teaching. Chemistry classroom teaching supported by information technology has strong operability and scalability and can effectively enhance the effect of chemistry teaching. Through interaction, students can be more actively involved in classroom teaching, which promotes the enhancement of learning interest. However, many chemistry teachers are not fully aware of the importance of information technology and its importance to education, and are still using traditional teaching methods. This leads to a significant reduction in the effectiveness of chemistry teaching. Based on this, this paper explores innovative strategies for chemistry classroom teaching supported by information technology to improve the teaching effect and quality of chemistry teaching, as well as to enhance students' learning interest and initiative. This is of great practical significance and educational value, providing reference for the reform of chemistry education and the application of information technology in the field of education. This paper also provides guidance for teachers in teaching practice to improve the level and quality of chemistry classroom teaching [1-2].

1.2 Research Significance

The significance of this research is to explore the innovation of chemistry classroom teaching supported by information technology, to improve the quality and effect of chemistry teaching, and to promote the initiative of students in learning chemistry. Through this research, we can understand the current situation of information technology in chemistry education and its shortcomings. The students' attitudes towards chemistry teaching supported by information technology are analyzed and corresponding innovative strategies are proposed. It further explores the application of information technology in chemistry education, providing a reference for the reform of chemistry

teaching and promoting the modern development of chemistry teaching.

2. Analysis of the Current Situation of Chemistry Classroom Teaching Supported by Information Technology

2.1 Problems with the Traditional Chemistry Classroom Teaching Model

The traditional chemistry teaching model mainly adopts methods such as lectures, demonstrations, experiments, and exams. The teacher gives stiff explanations, and students may only passively accept them. There are the following problems with this teaching model:

The traditional chemistry teaching focuses on the explanation and memorization of knowledge points, lacking vivid cases. It can easily cause students to become disgusted and thus unable to truly understand the knowledge points of chemistry, making it difficult for students to grasp and understand these knowledge points[3].

Also, traditional chemistry classrooms mainly focus on teacher explanations and demonstrations. Students in the classroom can only passively listen to his explanation of knowledge points and observe his demonstration. There is a lack of interaction and communication between students, and between students and teachers, which means there is a lack of practicality and experiential learning.

In traditional chemistry classrooms, there is a “one size fits all” teaching method. It cannot meet the learning needs of different students and the learning differences between different students, and lacks targeting and individualization.

The evaluation system is single and cannot comprehensively evaluate students' learning effects and abilities. It ignores the evaluation of students' thinking ability, innovation ability, and practical ability.

Based on these inertial thinking of traditional chemistry teaching models, it needs to be improved and innovated. We need to adopt more flexible, diversified, interactive, and practical teaching methods to promote students' learning interest and improve teaching effects[4-5].

2.2 Current Status of the Application of Information Technology in Chemistry Classroom Teaching

In recent years, with the development of information technology and the internet, more and more modern information technologies have been applied to the field of teaching, promoting the innovative development of education and teaching. People have realized the application of information technology in chemistry classroom teaching. It has also gradually become a research hotspot in chemistry education and a direction of teaching reform. In recent years, the main applications of information technology in chemistry classroom teaching are as follows:

By using multimedia technology, some rich elements such as pictures, videos, animations, etc., are incorporated into chemistry teaching, making the teaching content more vivid and easier for students to understand[6].

With the use of virtual experiment software, students can perform chemical experiments in the virtual experiment. This allows students to master the experiment process and related experiment knowledge in a safe situation, improving the ability and safety of students to master knowledge.

By using information technology, students can interact with teachers, discuss and communicate online. This further strengthens the communication between teachers and students, and they can communicate with the teacher in time when encountering difficulties.

Mobile devices such as mobile phones, iPads, etc., can be used to learn chemistry knowledge anytime and anywhere, further increasing the flexibility and freedom of learning time.

Through these applications of information technology in chemistry classroom teaching, the teaching methods can be enriched, the teaching effects can be improved, the students' interest and hobbies can be further stimulated, and it is an important development trend in future education[7-8].

2.3 Analysis of Students' Attitudes Towards Chemistry Classroom Teaching Supported by Information Technology

The main teaching target of the chemistry classroom is students. Therefore, the attitudes of students directly reflect the effect and quality of teaching. Research on students' attitudes towards chemistry classroom teaching supported by information technology is of great significance for understanding the application effect of information technology in chemistry education and the direction of improvement.

Through a survey of students' attitudes towards teaching supported by information technology, the overall attitude is relatively positive. Most students believe that information technology can make chemistry classrooms more vivid and easier to understand and can improve the efficiency and interest in learning chemistry[9-10].

At the same time, it is also understood that students have different attitudes towards different forms of information technology in chemistry classroom teaching. Multimedia teaching and virtual experiment teaching are teaching forms that students can accept because they can effectively improve the interest and effect of learning chemistry. Interactive teaching and mobile learning are only welcomed by fewer students, which needs to further explore its applicability in chemistry education. The study found that students' attitudes towards chemistry classroom teaching supported by information technology are related to their individual learning characteristics and habits. For those students who like traditional teaching methods, chemistry classrooms supported by information technology may bring some discomfort to them, and they need to be gradually guided in teaching practice[11].

3. Innovative Strategies for Chemistry Classroom Teaching Supported by Information Technology

3.1 Expanding Teaching Content with the Aid of Information Technology

Information technology can help chemistry education expand a wider range of teaching content. It displays chemistry knowledge in diverse ways, better stimulating students' interest and creativity, thereby improving teaching effects and teaching quality.

Information technology can provide more diversified demonstrations for chemistry teaching. Tools like multimedia teaching and 3D animations can be used to present chemical reactions, molecular structures, and other concepts, allowing students to understand and grasp chemistry knowledge more clearly. Through online resources and chemistry databases, students can gain in-depth knowledge of the cutting-edge applications and progress in chemistry, stimulating their interest and curiosity in chemical applications.

By using virtual experiment platforms or simulation software, chemistry experimental teaching can provide richer possibilities. This can realize digital simulations of chemistry experiments, enabling students to perform chemical experiment operations in a virtual environment, thus mastering the principles and steps of the experiment, and avoiding potential dangers and pollution problems[12-13].

Using information technology can also help chemistry education expand into interdisciplinary courses, allowing students to understand the widespread application of chemistry in various fields. Through extensive popular science education, chemistry education becomes more comprehensive and in-depth, providing students with a richer and more interesting learning experience, further stimulating their interest in learning chemistry, and thereby improving teaching effects and teaching quality.

3.2 Improving Teaching Effects with Information Technology

The application of information technology can improve the effectiveness of chemistry teaching. By using a variety of teaching methods and more innovative teaching modes, it can help students better grasp chemistry knowledge, enhance their interest in learning chemistry, and further improve teaching effects.

Information technology can provide a more personalized and targeted learning experience. Through online platforms and online teaching resources, students can independently select learning content and control their learning progress and difficulty, further improving learning autonomy and positivity. Also, information technology can provide personalized suggestions and feedback based on students' learning information and behavior to help them better master chemistry knowledge. Information technology can provide a better learning environment, enabling students to interact better with teachers. Through online discussions, online Q&As, interactive classrooms, and other methods, students can participate more actively in chemistry classes, thereby improving learning participation and positivity. In the meantime, teachers can understand students' learning situations and their questions in real-time through online platforms and tools, and promptly provide teaching guidance to improve teaching effects and enhance students' learning achievements. Information technology can provide more comprehensive and systematic teaching resources. Through online resources, open courses, and teaching videos, students can acquire more comprehensive knowledge of chemistry. Teachers can also design teaching courses, integrate teaching resources, and manage students through online teaching platforms and teaching management tools, improving teaching quality and the effects of chemistry education[14].

3.3 Play the Interactive Role of Information Technology in Classroom Teaching

With the support of information technology, interactive teaching can be better integrated into the classroom, enabling students to participate more effectively. This allows them to actively engage in class, interact with teachers and classmates, and jointly achieve teaching goals.

Various means of interaction also reflect the advantages of information technology in chemistry classrooms. By using smart blackboards, projectors, and other tools, teachers can design a variety of interactive classes. Students can actively participate in the classroom, express their views, deepen their understanding and memory of chemistry knowledge. It can also provide richer evaluation methods for chemistry classroom teaching. Through online quizzes, exams, etc., teachers can understand students' learning situations and knowledge mastery in real time, providing more precise teaching content for students and helping them better grasp chemistry knowledge[15].

3.4 Build an Evaluation System for Chemistry Classroom Teaching Supported by Information Technology

In order to better evaluate and improve the effects of chemistry classroom teaching supported by information technology, a scientific and reasonable evaluation system needs to be established. The evaluation system needs to consider the students' mastery of knowledge, including exam scores, homework completion, and performance in class. It also needs to consider attitudes towards learning, study habits, and enthusiasm. The evaluation system needs to take into account the effects of teaching innovation supported by information technology, teachers' innovation capabilities, online educational resources, etc. It also needs to consider the students' learning experience and satisfaction. Through these evaluation systems, the effects of chemistry classroom teaching supported by information technology can be comprehensively and scientifically evaluated and improved.

4. Conclusion and Future Work

4.1 Research Conclusion

This study reveals that traditional teaching classrooms have many issues and cannot effectively meet the needs of modern chemistry education. The application of information technology can effectively improve the outcomes of chemistry classroom teaching. Aspects of information technology application include using information technology tools to expand teaching content, improve teaching effectiveness, play an interactive role in classroom teaching, and build an evaluation system for chemistry classroom teaching supported by information technology. Through analysis and surveys, students generally have a positive attitude towards chemistry classroom

teaching supported by information technology. They believe that information technology has played a good auxiliary role in chemistry classes, effectively improving their learning outcomes and interest. It also provides teachers with practical teaching methods and guidance.

4.2 Limitations and Improvements

While we have explored and studied chemistry classroom teaching supported by information technology, we still find some shortcomings and areas that need improvement. This study only conducted theoretical exploration and analysis without involving large-scale experiments and surveys. Also, the research in this paper has certain limitations, and it may not adequately represent the teaching situations in chemistry classrooms across the country. To improve the study, in future research, we need to further expand the scope of the study, conduct larger-scale experiments and surveys, deeply understand the advantages and disadvantages of chemistry classroom teaching content supported by information technology, and better guide teachers in teaching.

4.3 Future Research Direction

In the future, we will further explore and perfect the teaching model of the chemistry classroom supported by information technology based on this study. We will further explore the application of information technology in chemistry classroom teaching. With the continuous updates and iterations of information technology in recent years, there is even more room for development in the future. Therefore, it is necessary to further delve into the application of information technology in chemistry classrooms. Secondly, how to better integrate information technology with chemistry knowledge, to make it easier for students to understand and master chemistry knowledge, still needs further research and discussion. To truly benefit teachers and students from information technology, efforts need to be made in teacher training and textbook writing, to enhance the application level of information technology for teachers, and to provide students with better, high-quality textbook resources.

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