International Journal of Social Science and Education Research Volume 8 Issue 2, 2025
ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

The Integration of Curriculum Ideology and Politics with Green Chemistry Education

Wenjuan Li and Lanlan Zhao

Jining Normal University, Wulanchabu, Inner Mongolia, China

Abstract

In today's education field, the integration of curriculum ideology and politics has become an important trend, and the combination of green chemistry, as the frontier idea of chemistry, and curriculum ideology and politics has far-reaching significance. The purpose of this paper is to deeply explore the necessity, feasibility and realization of the integration of curriculum ideological and political education with green chemistry, in order to provide theoretical support and practical guidance for training chemical talents with social responsibility and environmental awareness.

Keywords

Curriculum ideology and politics; Green chemistry; High school education.

1. Introduction

With the development of society and the progress of science and technology, environmental protection and sustainable development have become the focus of global attention. Chemistry, as a subject closely related to production and life, has not only promoted social progress, but also brought some environmental problems. Therefore, integrating the concept of green chemistry into chemistry education and cultivating students' awareness of environmental protection and sense of responsibility has become an important direction of chemistry education reform. At the same time, as a new educational concept, curriculum ideological and political education emphasizes the ideological and political education throughout the whole process of education and teaching, to realize the education of all students, the whole process of education and all-round education.[1] The integration of curriculum ideological and political education with green chemistry education can not only improve students' professional quality, but also cultivate students' values and sense of social responsibility, which has important practical significance.

2. The Necessity of Integrating Curriculum Ideological and Political Education with Green Chemistry Education

2.1. The need to train all-round chemical talents

The requirements of modern society for chemical talents include not only solid professional knowledge and skills, but also good moral character, social responsibility and environmental awareness. The integration of curriculum ideology and politics with green chemistry education can enable students to establish a correct world outlook, outlook on life and values while learning chemistry knowledge, cultivate students' innovative spirit and practical ability, and promote students' all-round development.

2.2. The need to respond to environmental challenges

The development of the chemical industry has put enormous pressure on the environment, such as greenhouse gas emissions, water pollution, soil pollution, etc. The concept of green chemistry aims to reduce or eliminate chemical pollution at the source and achieve sustainable

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

development of the chemical industry. [2] Combining green chemistry education with curriculum ideology and politics can enhance students' awareness of environmental protection and stimulate students' sense of responsibility and mission to contribute to solving environmental problems.

2.3. The need to promote chemical education reform

Traditional chemistry education pays attention to imparting knowledge and training skills, but neglects ideological and political education and environmental protection education. The integration of ideological and political education and green chemistry education can enrich the connotation of chemical education, innovate the teaching methods, improve the quality and level of chemical education, and promote the reform and development of chemical education.

3. Feasibility of the Integration of Curriculum Ideological and Political Education with Green Chemistry Education

3.1. The concept of green chemistry itself contains ideological and political elements

The core principles of green chemistry, such as "pollution prevention is better than pollution control", "atomic economy" and "green synthesis route", not only reflect the scientific thinking method, but also contain the values of resource conservation, environmental protection and sustainable development.[3] These values are consistent with the ideological and political goals of the curriculum, providing an internal basis for the integration of the two.

3.2. Chemistry course content provides a carrier for integration

Many knowledge points involved in chemistry courses, such as chemical reaction principles, chemical process flow, chemical experiments, etc., can be combined with green chemistry concepts and integrated into the content of ideological and political education. For example, when explaining chemical reaction rate and chemical equilibrium, students can be guided to think about how to achieve energy saving and emission reduction by optimizing reaction conditions; In the teaching of chemical experiments, students can be taught to abide by the experimental norms and reduce the emission of experimental waste.

3.3. The leading role of teachers provides a guarantee for integration

As the organizer and implementer of education and teaching, teachers play a key role in the integration of curriculum ideology and politics with green chemistry education. By digging deeply into the ideological and political elements in chemistry curriculum, teachers can carefully design teaching programs, organically integrate ideological and political education into green chemistry education, and guide students to establish correct values.

4. Ways to Realize The Integration of Ideological and Political Education and Green Chemistry Education in The Curriculum

4.1. Optimize the curriculum system

In the chemistry curriculum system, special green chemistry courses and curriculum ideological and political modules are set up, and the concepts and methods of green chemistry and the content of ideological and political education are incorporated into the teaching syllabus and textbooks. [4] At the same time, the connection and integration between different courses should be strengthened to form an organic whole.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

4.2. Innovative teaching methods

Adopt a variety of teaching methods, such as case teaching, project teaching, inquiry teaching, etc., to stimulate students' learning interest and initiative. In the teaching process, practical cases are introduced to allow students to analyze and solve problems related to green chemistry, so as to cultivate students' innovative thinking and practical ability. At the same time, activities such as group discussions and keynote speeches are organized to guide students to think about the relationship between green chemistry, social development and personal responsibility, and enhance students' sense of social responsibility.[5]

4.3. Strengthen practical teaching

Practical teaching is an important link of green chemistry education and an effective way to integrate curriculum ideology and politics with green chemistry education. Through chemical experiments, practical training, scientific research and innovation and other practical activities, let students experience the practice process of green chemistry, cultivate students' hands-on ability and the ability to solve practical problems. In practice teaching, emphasis is placed on cultivating students' teamwork spirit, professional ethics and environmental awareness.

4.4. Improve the evaluation system

Establish a scientific and reasonable evaluation system to comprehensively evaluate students' learning effects. The evaluation should include not only students' knowledge mastery and skill level, but also students' ideological and political performance, environmental awareness and social responsibility.[6] The methods of evaluation should be diversified, and the combination of examination, homework, experiment report, paper and practical activity performance should be adopted to give full play to the motivating and guiding role of evaluation.

5. Curriculum Ideological and Political Integration of Green Chemistry Education Practice

The survey objects in this part are some senior high school students of A Middle School in a key high school in Ulanqab City. Some classes of senior high school in this high school are randomly selected to issue questionnaires. The questions reflected in the questionnaire results are universal. Based on relevant data, the questionnaire on the Integration of ideological and political elements in High School Chemistry Experiment Teaching (teacher version) (Student version) was researched and designed (see appendix for details). A total of 300 questionnaires were issued and 300 were recovered, of which 300 were valid, with an effective rate of 100%.

The collected questionnaires were sorted out, summarized and analyzed, and the analysis results were summarized as follows: the total number of students in this survey was 300, male students accounted for 49.09%, female students accounted for 50.91%, and the ratio of male and female students was basically 1:1. The students are distributed evenly and randomly, and they are distributed in every class of Senior one, including ordinary classes and key classes. Therefore, the survey data is representative to a certain extent. The questionnaire survey mainly focuses on two aspects: one is about students' attitude towards high school chemistry courses, and the other is about students' cognition of teachers' integration of ideological and political education in classroom teaching.

According to the survey data, the proportion of students who like chemistry very much or like chemistry in this survey accounts for 85.37%(as shown in Figure 5-1). Meanwhile, in the actual classroom teaching, 77.23% of the students think that it is very important or relatively important for teachers to integrate ideological and political education in chemistry classroom teaching (as shown in Figure 5-2). After sorting out and analyzing these data, it can be concluded that there is a certain basis for teachers and students to support the integration of

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

curriculum ideology and politics in middle school classrooms. However, according to the survey results, only 46.78% of teachers in chemistry classes often expand and extend their knowledge of chemists, chemical history history and chemical culture (as shown in Figure 5-3). It can be seen that teachers' awareness of the integration of curriculum ideology and politics in the chemistry class of middle school still needs to be strengthened to some extent.

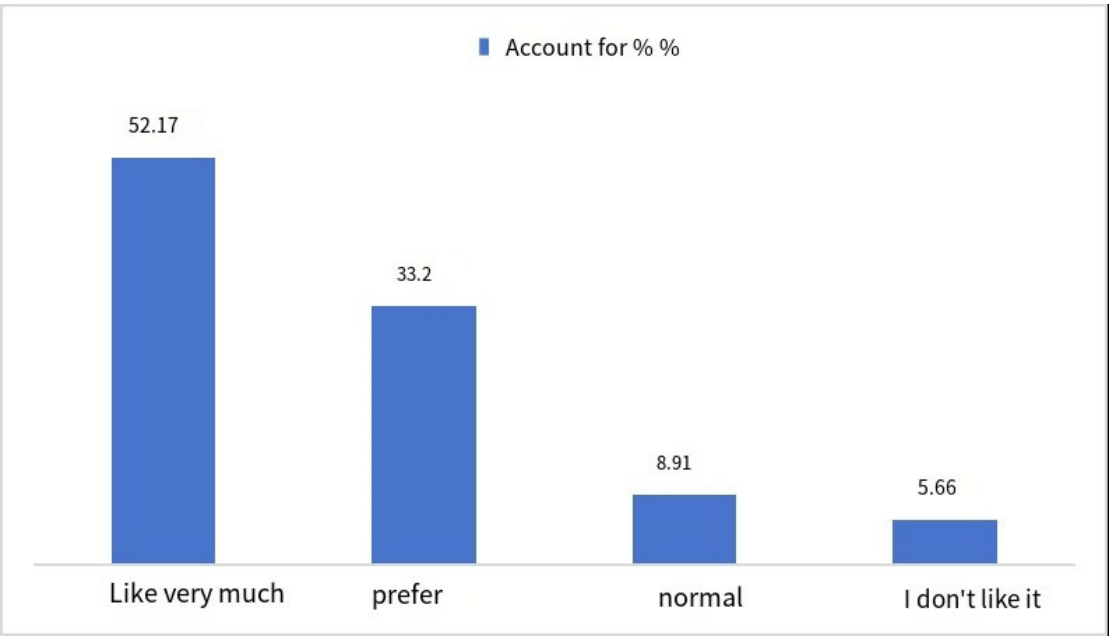

Figure 5-1. Distribution of students' attitudes towards chemistry

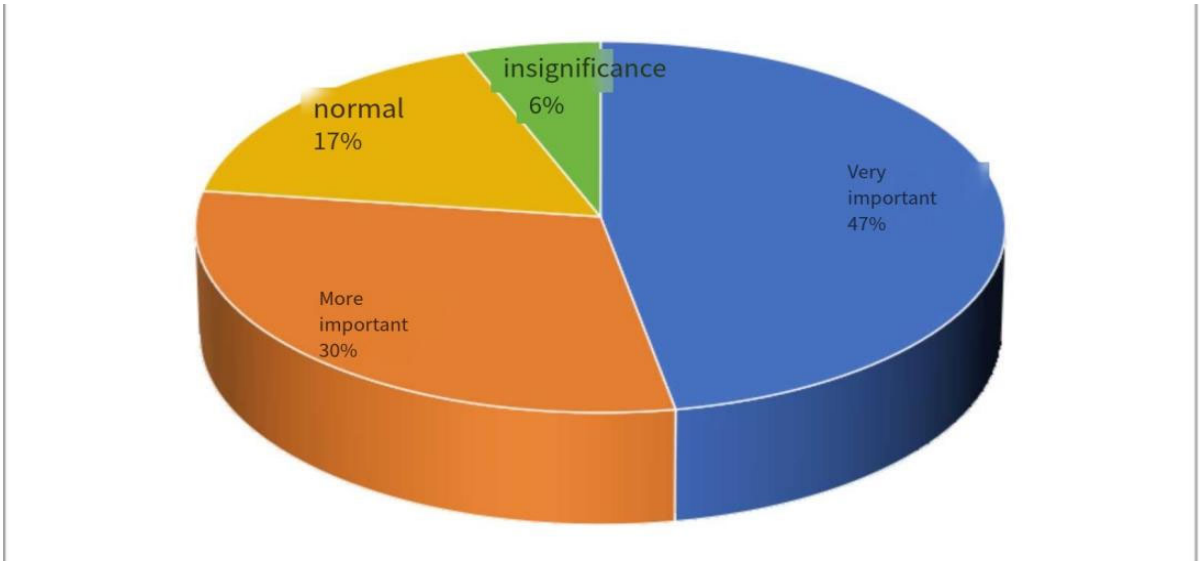

Figure 5-2. Distribution of students' opinions on the integration of curriculum ideology and politics into chemistry teaching

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

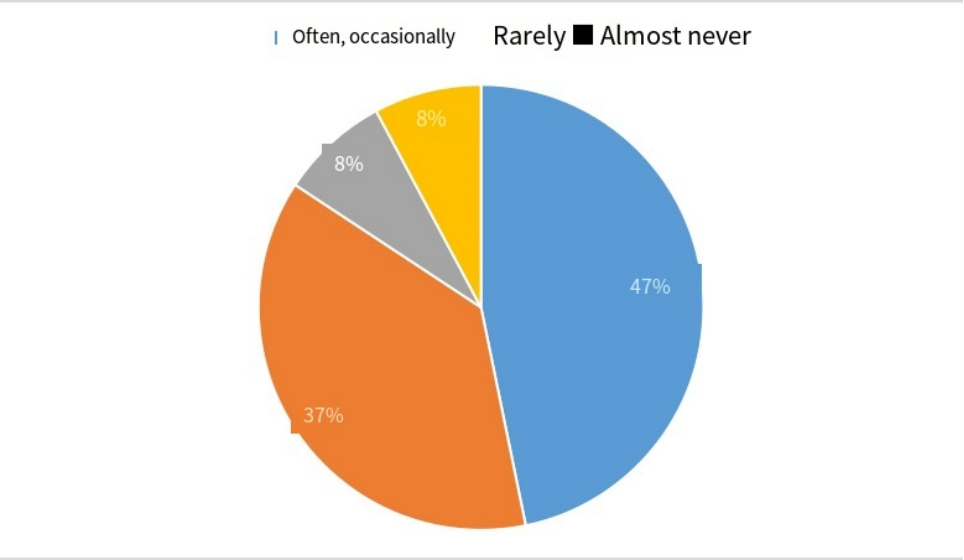

Figure 5-3. Distribution of teachers' extracurricular development

6. Conclusion

The integration of curriculum ideology and politics with green chemistry education is an inevitable requirement for cultivating all-round chemical talents, coping with environmental challenges and promoting the reform of chemical education. By optimizing the curriculum system, innovating the teaching method, strengthening the practical teaching and improving the evaluation system, the organic integration of the two can be realized, the quality and level of chemistry education can be improved, and more high-quality chemical talents with social responsibility and environmental protection awareness can be cultivated for the society. In the future education and teaching, we should continue to explore and innovate, promote the deep integration of curriculum ideology and politics with green chemistry education, and contribute to the realization of the Chinese dream of the great rejuvenation of the Chinese nation.

6.1. The integration of curriculum ideological and political education and green chemistry education needs to pay attention to the following key issues:

6.1.1 Avoid rigid combination: the integration of the two should be natural and smooth, and cannot be forcibly pieced together for the sake of integration. It is necessary to ensure the organic combination of ideological and political education elements and green chemistry knowledge points, in line with teaching logic and students' cognitive laws.[7]

6.1.2 Key points of balanced education: In the process of integration, attention should be paid to the balance between the professional knowledge imparting of green chemistry and the guidance of ideological and political education, which should not be neglected, resulting in students' lack of solid grasp of professional knowledge or ideological and political education becoming a mere formality.

6.1.3 Pay attention to the individual differences of students: different students have different acceptance abilities and interest points, and diversified teaching methods and means should be adopted according to the characteristics and needs of students, so that every student can gain something from the integrated education.

6.1.4 Improvement of teachers' quality: Teachers need to continuously improve their professional quality and ideological and political level, deeply understand the connotation of green chemistry and the requirements of curriculum ideology and politics, in order to effectively carry out integrated teaching.[8]

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

6.1.5 Adaptation of textbook content: The selected or compiled textbooks should be able to fully reflect the integration of the two, and the content should be accurate, novel, targeted and practical.

6.1.6 Implementation of practical teaching: Green chemistry education pays attention to practice, and when integrating ideological and political thinking into the curriculum in practical teaching, it is necessary to ensure that the design of practical links is reasonable, so that students can realize the importance of green chemistry and the significance of ideological and political education in actual operation.

6.1.7 Scientific evaluation: Establish a scientific and comprehensive evaluation system, not only to examine students' professional knowledge and skills, but also to evaluate students' performance in ideological and political aspects, such as environmental awareness, social responsibility and so on.

6.1.8 Continuous improvement and innovation: the educational environment and the needs of students are constantly changing, and integrated education also needs continuous improvement and innovation, timely summing up experience and lessons, and constantly optimizing the teaching content and methods.

6.2. Integrate ideological and political elements into the experimental teaching of green chemistry.

6.2.1. Experimental design

(1) Emphasize the safety and environmental protection of the experiment, cultivate students' sense of responsibility and respect for life and the environment. For example, when explaining the experimental operation rules, it is mentioned that strict compliance with the rules is not only the key to ensure the success of the experiment, but also the performance of being responsible for the safety of oneself and others, reflecting the sense of responsibility and the spirit of responsibility.

(2) Guide students to choose green experimental programs, such as the use of low-toxic and recyclable reagents to reduce the generation of waste. This can cultivate students' sense of conservation and sustainable development, and let students understand that scientific research should take into account economic and social benefits.

6.2.2. Experiment preparation

(1) Organize students to participate in the preparation and arrangement of experimental instruments, and cultivate students' teamwork spirit and labor consciousness. In teamwork, let students learn to communicate, coordinate and help each other, and understand the role and value of individuals in the collective.

(2) Introduce the development history of experimental instruments and the innovation achievements of our country in related fields, stimulate students' national pride and patriotic feelings, and encourage students to innovate and contribute to the progress of national science and technology.

6.2.3. Experimental process

(1) When there is an accident or failure in the experiment, guide students to deal with setbacks correctly, and cultivate students' tenacity and problem-solving ability. Encourage students to sum up experience from failure, cultivate a scientific and rigorous attitude and the spirit of seeking truth from facts.

(2) Observe the performance of students in the experiment, correct the non-standard operation behavior in time, and cultivate the students' sense of rules and good habits of abiding by discipline.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202502_8(2).0014

6.2.4. Analysis of experimental results

(1) Guide students to accurately record and objectively analyze experimental data, and cultivate students' sense of integrity and scientific spirit. Let students understand that in scientific research, falsification is against moral and legal behavior.

(2) Discuss the experimental results, encourage students to express different viewpoints and opinions, cultivate students' innovative thinking and critical thinking, and guide students to respect the views of others and cultivate an inclusive and open academic attitude.

6.2.5. Experiment summary session

(1) Let the students summarize the whole experiment process, including the harvest of the experiment, existing problems and suggestions for improvement. Through reflection, cultivate students' self-cognition and self-improvement ability.

(2) Emphasize the importance of green chemistry experiment for environmental protection and sustainable social development, guide students to pay attention to social problems, enhance social responsibility, and establish the lofty ideal of contributing to the progress and development of human society.

In short, the organic integration of ideological and political elements in the course into all aspects of green chemistry experiment teaching can realize the coordinated development of knowledge imparts, ability training and value guidance, and cultivate innovative talents with noble morality and solid professional literacy.

Acknowledgments

Funded Project: Inner Mongolia Autonomous Region's 14th Five-Year Plan Project

References

[1] Yao Jiancheng, Ma Xiaoyan, Li Hongying. Penetration and Implementation of Green Chemistry in Middle School Chemistry Experiment Teaching [J]. Anhui Chemical Industry, 2019, 45(04): 144-145+148.

[2] Ye Xia. Ways and Strategies of Green Chemistry Concept Infiltration in Middle School Chemistry [D]. Henan University, 2017.

[3] Yin Guojie, Wei Yingliang. The Penetration of Ideological and Political Concepts in the Teaching of Inorganic Chemistry: A Case Study of Applied Chemistry [J]. Popular Science and Technology, 2019, 21(03): 77-78.

[4] Thinking and Exploration of Curriculum Ideology and Politics – Taking Organic Chemistry as an Example [J]. University Education, 2019, 12(12): 96-98.

[5] Gao Yahui, Li Juan, Zhao Dan, Zhang Shaowen. Exploration and Practice of the Integration of Curriculum Ideology and Politics with “Green Chemistry” Teaching [J]. Journal of Science and Technology Wind, 2020, (16): 46-49.

[6] Kuan Taijie. Penetration Analysis of Green Chemistry Concept in Middle School Chemistry Teaching [J]. Modern Vocational Education, 2021(51): 86-87.

[7] Li Jungui. The Penetration of Green Chemistry Education Concept in Middle School Chemistry Experiment Teaching [J]. Contemporary Chemical Research, 2019(02): 22-23.

[8] Ye Changjun, Li Dan, Zhang Juan. Problems and Countermeasures of Green Chemistry Teaching in Middle School Chemistry [J]. Chemical Education (Chinese and English), 2018, 39(17): 18-21. DOI: 10.13884/J.1003-3807HXJY.2016110086.