

Teaching Reform in Advanced Inorganic Chemistry with Chinese National Community Consciousness

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Abstract: This paper takes the course Advanced Inorganic Chemistry as an entry point to explore effective approaches for embedding the consciousness of the Chinese national community into course teaching and cultivating outstanding talents from all ethnic groups. In the context of today's increasingly integrated multicultural environment, integrating the consciousness of the Chinese national community into professional course teaching has important practical significance. The paper analyzes the necessity and feasibility of incorporating this consciousness into the teaching of Advanced Inorganic Chemistry, and proposes concrete teaching reform measures, including the reconstruction of teaching objectives, the optimization of teaching content, the innovation of teaching methods, and the improvement of the evaluation system. These measures are verified through practical teaching cases. The aim is to provide references and insights for cultivating high-quality talents with a strong sense of the Chinese national community through professional course teaching in universities.

1. Introduction

The consciousness of the Chinese national community is the foundation of national unity, the cornerstone of ethnic solidarity, and the soul of spiritual strength. In higher education, forging a strong sense of community for the Chinese nation is an important task in cultivating socialist builders and successors who are well-rounded in moral, intellectual, physical, aesthetic, and labor development. Professional courses, as the core carriers of talent cultivation in universities, shoulder the dual mission of knowledge transmission and value formation. As an important core course in the chemistry major, Advanced Inorganic Chemistry should not only transmit advanced knowledge and skills in inorganic chemistry, but also integrate the consciousness of the Chinese national community into the teaching process, cultivate students' patriotism, sense of national identity, and social responsibility, and thereby contribute to the cultivation of outstanding talents from all ethnic groups. Taking the Advanced Inorganic Chemistry course as the carrier, this study explores in depth how to effectively embed education on the consciousness of the Chinese national community into professional course teaching, so as to realize the organic unity of knowledge transmission, competence cultivation, and value guidance. By excavating ideological and political elements

within the course content—such as national cultural connotations, the spirit of the scientific community, and national strategic needs—and by designing diversified teaching paths (e.g., case-based teaching, thematic seminars, practical projects, and cultural integration), a tripartite system of teaching objectives (“knowledge–ability–value”) is constructed. The study aims to provide a theoretical basis and practical paradigm for carrying out education that forges a strong sense of community for the Chinese nation in science and engineering courses, and to cultivate excellent talents who possess solid professional competence, a strong sense of family and nation, global vision, and a strong consciousness of the Chinese national community. In today’s era of globalization and multicultural integration, forging a strong sense of community for the Chinese nation is of great strategic significance for safeguarding national unity, promoting ethnic solidarity, and realizing the great rejuvenation of the Chinese nation. Higher education, as a key arena for cultivating high-quality talents, bears the important mission of nurturing outstanding talents with a strong sense of the Chinese national community. As a core course in the chemistry major, Advanced Inorganic Chemistry is not only responsible for imparting professional knowledge and skills, but must also integrate this consciousness into the teaching process, guide students to establish correct views of the nation, ethnicity, and history, and cultivate patriotism and social responsibility, so as to supply morally and professionally competent talents for the development of ethnic regions and national construction. In the present era, forging the consciousness of the Chinese national community has become a fundamental cornerstone for safeguarding national unity and promoting ethnic solidarity. Higher education, as a crucial stage of talent cultivation, shoulders the responsibility of cultivating outstanding talents who possess both a strong sense of the Chinese national community and solid professional competence. As a core course in the chemistry major, Advanced Inorganic Chemistry should not only deliver specialized knowledge and skills, but should also serve as an important carrier for forging this community consciousness. Embedding relevant educational content into the course can help cultivate students’ devotion to the country, sense of national identity, and social responsibility, and provide qualified talents for the development of ethnic regions and the modernization of the country. The consciousness of the Chinese national community refers to a high-level recognition of the pattern of diversity in unity of the Chinese nation. It emphasizes the close connections and common development of all ethnic groups in terms of history, culture, economy, and society. It encompasses shared historical memory, cultural identity, value concepts, and national identity, and serves as the spiritual bond that maintains the unity of the Chinese nation and the integrity of the state. “Curriculum-based ideological and political education” refers to the integration of ideological and political education into the entire process of professional course teaching, thereby achieving the organic unity of knowledge transmission and value guidance. Carrying out education on the consciousness of the Chinese national community within the Advanced Inorganic Chemistry course is an important manifestation of curriculum-based ideological and political education. By excavating the ideological and political elements embedded in the course and integrating the connotations of this community consciousness into teaching content and processes, students can, while learning professional knowledge, also strengthen their sense of identification and belonging to the Chinese nation.^[1]

The Advanced Inorganic Chemistry course itself contains abundant ideological and political resources. From the perspective of disciplinary development, many Chinese scientists have made important achievements in inorganic chemistry. Their patriotic spirit and scientific contributions can serve as vivid materials for educating students. At the same time, the application of inorganic chemistry in resource development, environmental protection, and new materials research is closely related to national development and the practical needs of ethnic regions, providing a broad space for integrating the consciousness of the Chinese national community into the course.

2. The Necessity of Integrating the Consciousness of the Chinese National Community into the Teaching of Advanced Inorganic Chemistry

2.1 A Requirement for Implementing the Fundamental Task of Fostering Virtue through Education

The fundamental task of universities is to foster virtue through education. The questions of what kind of people to cultivate, how to cultivate them, and for whom they are cultivated are fundamental issues in education. Integrating the consciousness of the Chinese national community into the teaching of Advanced Inorganic Chemistry is conducive to guiding students to establish correct worldviews, outlooks on life, and values; cultivating their patriotism and collectivism; and helping them become socialist builders and successors who are idealistic, morally sound, cultured, and disciplined.

This study aims to explore effective pathways and methods for forging the consciousness of the Chinese national community and cultivating outstanding talents from all ethnic groups within the Advanced Inorganic Chemistry course. Through literature research, relevant theories and practical experiences are sorted; through case analysis, ideological and political elements within the course are examined in depth; through action research, teaching methods are continuously explored and improved in practice; and through questionnaires and interviews, students' learning needs and feedback are collected in order to evaluate the effectiveness of teaching reforms. The consciousness of the Chinese national community is a high-level recognition and conscious maintenance of the pattern of diversity in unity of the Chinese nation. It underscores the close connections and common development of all ethnic groups in history, culture, economy, and society. It embodies the value pursuit of joint struggle and common prosperity and reflects firm faith in national unity and ethnic solidarity.

2.2 A Requirement for Promoting Ethnic Unity and Social Stability

China is a unified multiethnic country, and ethnic unity is the cornerstone of national prosperity and stability. Integrating the consciousness of the Chinese national community into the Advanced Inorganic Chemistry teaching can enhance students' sense of identification and belonging to the Chinese nation, promote communication and cooperation among students from different ethnic groups, foster a united and harmonious campus atmosphere, and lay a solid foundation for safeguarding ethnic unity and social stability.

Curriculum-based ideological and political education involves embedding ideological and political education into all kinds of courses to achieve the organic unity of knowledge transmission and value guidance. Implementing curriculum-based ideological and political education in science and engineering courses helps break the phenomenon of "two separate skins" between ideological-political education and professional education. In this way, students are subtly influenced by ideological and political education while learning professional knowledge, and are guided to develop correct worldviews, outlooks on life, and values.^[1]

2.3 A Requirement for Improving Students' Comprehensive Quality and Competitiveness

In the context of globalization, outstanding talents from all ethnic groups not only need solid professional knowledge and skills, but also broad vision, good humanistic literacy, and a strong sense of social responsibility. Integrating the consciousness of the Chinese national community into the teaching of Advanced Inorganic Chemistry can cultivate team spirit, innovation capability, and social adaptability among students, thus enhancing their overall quality and competitiveness and

enabling them to better adapt to the needs of social development. The Advanced Inorganic Chemistry course contains rich ideological and political resources, such as ancient Chinese achievements in chemistry, national strategic needs in modern chemical research, and scientists' patriotic spirit. By excavating these ideological and political elements, the consciousness of the Chinese national community can be naturally incorporated into course teaching, thereby realizing the synergy between professional education and ideological–political education.^[2]

3. The Feasibility of Integrating the Consciousness of the Chinese National Community into Advanced Inorganic Chemistry Teaching

3.1 Abundant Ideological and Political Elements in Course Content

The Advanced Inorganic Chemistry course covers cutting-edge areas and the latest research achievements in inorganic chemistry, which embody rich ideological and political elements. For example, ancient China achieved many important accomplishments in the field of inorganic chemistry, such as bronze casting and ceramic firing. These achievements highlight the wisdom and creativity of the Chinese nation and provide vivid materials for cultivating students' sense of national pride and confidence. Moreover, research outcomes in inorganic chemistry play important roles in addressing global issues such as energy and environmental problems, which can guide students to develop a sense of responsibility and mission to contribute to the development of human society.^[3]

Traditional teaching objectives of Advanced Inorganic Chemistry focus mainly on knowledge transmission and skills training, while insufficiently emphasizing the cultivation of students' values and national spirit, and thus fail to fully reflect the educational requirements related to the consciousness of the Chinese national community. The teaching content lacks the integration of national culture and a sense of devotion to the country. It mainly revolves around professional knowledge and pays little attention to aspects such as ancient Chinese achievements in chemistry, ethnic characteristics in modern chemical research, and national strategic needs. As a result, students find it difficult to perceive the cultural heritage and patriotic sentiments of the Chinese nation through the course.

3.2 Teachers' Capacity for Conducting Ideological and Political Education

University teachers are the main implementers of curriculum-based ideological and political education. They not only possess solid professional knowledge and teaching capability, but also have relatively high ideological–political literacy and moral character. Teachers of Advanced Inorganic Chemistry can continuously enhance their ability in ideological and political education through ongoing learning and professional development, and skillfully integrate the consciousness of the Chinese national community into the teaching process, thereby realizing the organic unity of knowledge transmission and value guidance. However, in many cases, teaching methods still rely primarily on lecturing, lacking interactivity and practical activities. This reduces students' interest and emotional engagement in learning and is not conducive to cultivating the consciousness of the Chinese national community. The evaluation system is mainly based on examination results, neglecting students' performance in ideological and political aspects, teamwork, and social responsibility. Such an approach cannot fully reflect students' comprehensive quality or the effectiveness of forging their sense of the Chinese national community.

Reconstructing teaching objectives to incorporate the consciousness of the Chinese national community is therefore essential. This involves explicitly including this consciousness in the

teaching objective system and requiring that, while mastering professional knowledge and skills, students develop correct views of the country, ethnicity, and history, strengthen their identification with and sense of belonging to the Chinese nation, and cultivate patriotism and social responsibility. In teaching, for example, instructors can introduce ancient Chinese chemical achievements in ceramics, metallurgy, and alchemy-such as porcelain-making technologies and bronze-smelting techniques-to enable students to understand the long history and outstanding contributions of the Chinese nation in chemistry and to enhance their national pride and cultural self-confidence. By linking the course with national strategic needs in new energy, new materials, and environmental protection, teachers can explain the application of Advanced Inorganic Chemistry in addressing major national challenges-for instance, the critical role of rare-earth elements in new energy vehicles and aerospace. This helps students recognize the close connection between their professional study and national development and stimulates national pride and social responsibility. Furthermore, by narrating inspirational stories of Chinese scientists in inorganic chemistry-for example, the remarkable contributions and patriotic spirit of Academician Xu Guangxian in rare-earth chemistry-teachers can encourage students to take scientists as role models and establish aspirations to work for the development of the country and the nation.

4. Teaching Reform Measures for Integrating the Consciousness of the Chinese National Community into Advanced Inorganic Chemistry

4.1 Reconstructing Teaching Objectives

On the basis of the original goals of knowledge transmission and skills training, value-oriented objectives should be added by incorporating the consciousness of the Chinese national community into the teaching objective system. It should be clearly required that during the learning process of Advanced Inorganic Chemistry, students not only master basic theories, knowledge, and skills of inorganic chemistry, but also enhance their identification with and sense of belonging to the Chinese nation, establish correct views of the country, ethnicity, history, culture, and religion, and cultivate patriotism, national spirit, and social responsibility.

4.2 Optimizing Teaching Content

(1) Excavating ideological and political elements within the course.

The ideological and political elements embedded in the Advanced Inorganic Chemistry course should be thoroughly explored-for example, ancient and modern Chinese achievements in inorganic chemistry, scientists' patriotic spirit and dedication, and the contribution of chemical research to social development-and these elements should be organically integrated into the teaching content. For instance, when explaining coordination chemistry, teachers can introduce research achievements by Chinese scientists in the synthesis and application of coordination compounds to inspire students' national pride and innovative awareness.^[3]

(2) Combining with real-world cases.

Real-world cases relating to inorganic chemistry-such as new energy development, environmental protection, and pharmaceutical research and development-should be selected to guide students in applying their knowledge to analyze and solve practical problems. In the process of case analysis, education on the consciousness of the Chinese national community can be incorporated, helping students recognize the significance of chemical research for national development and people's well-being, and strengthening their social responsibility and sense of mission.

(3) Broadening cultural horizons.

Teaching should also introduce the contributions and cultural characteristics of different ethnic groups in the field of inorganic chemistry to promote cultural exchange and integration among students from various ethnic backgrounds. For example, teachers can present inorganic chemical knowledge embedded in traditional medicines of ethnic minorities, enabling students to appreciate the diversity and uniqueness of different ethnic cultures and enhancing their respect for and understanding of these cultures.

4.3 Innovating Teaching Methods

(1) Problem-based learning (PBL).

Instructors can design thought-provoking and challenging questions to guide students' active thinking and inquiry. For instance, when explaining reaction mechanisms in inorganic chemistry, they might pose questions such as "How can inorganic chemical reactions be applied to solve environmental problems?" to encourage students to cultivate innovative thinking and practical skills while also paying attention to social issues and enhancing their sense of social responsibility.

(2) Cooperative learning in groups.^[5]

Students can be organized into groups to engage in cooperative learning, where they jointly discuss, research, and solve problems. Group work fosters team spirit and communication skills, promotes interaction and cooperation among students from different ethnic groups, and strengthens their consciousness of the Chinese national community.

(3) Blended online–offline teaching.

Modern information technologies should be fully utilized to implement blended teaching. Online teaching can provide abundant resources—such as microlectures and online quizzes—to support self-directed learning and knowledge consolidation, while offline teaching can focus on classroom discussions and experimental operations to enhance interaction between teachers and students and among students themselves. Blended teaching can improve teaching efficiency and quality and offer students more flexible and diversified learning pathways.

4.4 Improving the Evaluation System

(1) Diversified evaluation indicators.

A diversified evaluation system should be established that assesses not only students' professional knowledge and skills but also their ideological and political literacy and moral character. For example, students' performance in class participation, group cooperation, and social practice can be included as evaluation indicators to comprehensively assess their overall quality.^[4]

On the basis of the original objectives related to knowledge, skills, processes, and methods, value-oriented objectives should be added. It should be explicitly required that students, while studying Advanced Inorganic Chemistry, deepen their understanding and recognition of the consciousness of the Chinese national community, establish correct national, ethnic, and historical perspectives, and cultivate patriotism and social responsibility. For instance, students can be required to learn about Chinese scientists' contributions to inorganic chemistry and to understand the importance of scientific and technological progress for national development and national rejuvenation.

(2) Deep excavation of ideological and political elements.

The ideological and political elements in the Advanced Inorganic Chemistry course should be further excavated to integrate the consciousness of the Chinese national community into teaching content. For example, when teaching rare earth elements, teachers can introduce the strategic significance of China's rare-earth resources and their development and utilization, as well as Chinese scientists' achievements in rare-earth separation and application. This can stimulate

students' national pride and sense of mission. At the same time, combined with the resource characteristics and development needs of ethnic regions—such as mineral resource development and environmental protection—students can be guided to reflect on the role of inorganic chemistry in promoting economic development and social progress in these regions.

(3) Integrating teaching content.

Teaching content should be integrated by breaking through traditional chapter boundaries so that related knowledge points can be organically combined with ideological and political elements. For example, when teaching coordination chemistry, teachers can introduce coordination-chemistry-related principles involved in ancient Chinese metallurgical techniques, thereby showcasing the brilliant achievements of ancient Chinese science and technology and enhancing students' cultural self-confidence. At the same time, by linking modern applications of coordination chemistry in drug development and environmental governance, students can be guided to focus on contemporary social issues and cultivate a sense of social responsibility.

(4) Combining formative and summative assessment.

Both formative assessment and summative assessment should be adopted. Formative assessment should be emphasized to track students' learning conditions and ideological dynamics in a timely manner and provide appropriate feedback and guidance. Summative assessment, such as final examinations and course papers, can be used to comprehensively evaluate students' learning outcomes. Combining formative and summative assessments improves the scientific nature and fairness of evaluation.

(5) Combining student self-evaluation and peer evaluation.

Students should be guided to conduct self-evaluation and peer evaluation so that they can reflect on their own learning and growth, identify strengths and weaknesses, and promote mutual learning and communication. Through peer evaluation, students' critical thinking and team spirit can be cultivated. Representative cases—such as China's successful development and utilization of rare-earth resources—can be selected to guide students in analyzing the chemical principles and technological applications involved while also discussing the national strategic significance and the underlying spirit of the Chinese nation. In this way, students' ability to analyze and solve problems can be cultivated. Group discussions can be organized, for example, on the role and opportunities of Advanced Inorganic Chemistry in the economic development of ethnic regions, to promote exchanges and collisions of ideas among students, strengthen teamwork, and strengthen their ethnic and community awareness. Practical teaching activities should also be carried out, such as involving students in inorganic chemistry experimental projects and research topics, so that students can experience the application and value of chemical knowledge in practice and cultivate their innovation capacity and practical skills. A diversified evaluation system should be established in which, in addition to examination scores, students' performance in ideological–political aspects, teamwork, and social responsibility is taken into account. For example, a comprehensive evaluation can be made based on classroom performance, group assignments, and social practice reports to fully reflect students' overall quality and the effectiveness of cultivating the consciousness of the Chinese national community.

Questionnaires, interviews, and analysis of examination scores can be used to evaluate the effectiveness of teaching reforms. Questionnaires mainly assess students' satisfaction with the teaching reforms, as well as their understanding and recognition of the consciousness of the Chinese national community. Interviews involve in-depth communication with students to understand their gains and experiences during the learning process. Examination-score analysis compares students' professional performance and comprehensive quality before and after the reforms. Results of the questionnaires indicate that students' satisfaction with the reformed teaching has improved significantly compared with the pre-reform situation. Students generally believe that the teaching

content has become richer and more engaging, and that teaching methods are more flexible and diversified, which better stimulates their interest in learning. Questionnaire and interview findings show that students' understanding and recognition of the consciousness of the Chinese national community have significantly improved. Most students report that through the course they have come to more deeply appreciate the pattern of diversity in unity of the Chinese nation and have strengthened their sense of identification and belonging. Analysis of examination scores reveals that students' professional performance has improved to some extent after the reforms and that their performance in areas such as teamwork, innovation ability, and social responsibility has also become more outstanding. This indicates that the teaching reforms help realize the organic unity of knowledge transmission, competence cultivation, and value formation.

5. Conclusion

Integrating the consciousness of the Chinese national community into the teaching of Advanced Inorganic Chemistry is both feasible and necessary. Through teaching reform measures such as reconstructing teaching objectives, optimizing teaching content, innovating teaching methods, and improving the evaluation system, education on this consciousness can be effectively combined with professional knowledge transmission, thereby enhancing the effectiveness and educational function of the course. Practical cases demonstrate that these reform measures can stimulate students' interest and enthusiasm for learning, improve their comprehensive quality and competitiveness, and strengthen their consciousness of the Chinese national community.

This study, through exploration and practice of teaching reform in Advanced Inorganic Chemistry, confirms that embedding the consciousness of the Chinese national community into professional courses is both feasible and of great significance. By reconstructing teaching objectives, optimizing teaching content, innovating teaching methods, and improving the evaluation system, it is possible to effectively integrate this consciousness into course teaching, realize the organic unity of knowledge transmission, competence cultivation, and value formation, and enhance students' comprehensive quality and their consciousness of the Chinese national community.

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