

Cognitive Comprehension of Incorporating Ideological and Political Components into the Teaching of Structural Chemistry

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Abstract:

Structural chemistry, as a vital component of the chemical discipline, is characterized by its distinct theoretical and practical features. It delves into the intrinsic relationship between the microscopic structure of matter and its macroscopic properties, employing modern chemical theories such as quantum theory and molecular orbital theory to uncover the internal structures and transformation laws of atoms, molecules, and crystals. The value of this course lies not only in imparting specialized knowledge but also in cultivating students' logical thinking abilities and scientific exploration spirit. Throughout the learning process, students can enhance their abstract thinking and spatial imagination skills, mastering the ability to apply chemical principles to solve practical problems. Meanwhile, the research methodologies of structural chemistry provide significant support for the advancement of fields such as materials science and life sciences, showcasing its broad application value in modern science and technology. Additionally, the structural chemistry course is imbued with rich scientific ideas and methods, which are crucial for improving students' scientific literacy and innovative capabilities. It also lays a solid foundation for further in-depth study of chemistry and related disciplines.

Keywords:

Structural Chemistry, Curriculum Ideology, Tactics, High Education

1. Introduction

Ideological and political education plays a crucial role in higher education. It is not only a key component in shaping students' correct worldview, outlook on life, and values, but also an important means to cultivate their sound personality and enhance their overall quality. Through ideological and political education, students can gain a deeper understanding of the nation's history, culture, policies, laws, and social responsibilities, thereby strengthening their sense of national pride and responsibility. In modern society, higher education faces diverse and complex challenges, making

ideological and political education particularly important [1]. It is not merely about imparting knowledge, but also about fostering emotional resonance and spiritual guidance. Therefore, higher education institutions should integrate ideological and political education throughout the entire teaching process, emphasizing the combination of theory and practice, continuously innovating teaching methods and approaches, and enhancing the relevance and effectiveness of ideological and political education [2]. Only in this way can we cultivate a new generation of college students who possess both professional knowledge and noble character, contributing to the nation's development and social progress. Only in this way can we cultivate outstanding talents with a strong sense of social responsibility, innovative spirit, and practical ability, who will actively contribute to the country's development and societal advancement. In specific teaching practices, teachers should fully leverage their leading role and guide students to actively participate in ideological and political education activities. This can be achieved by organizing visits to patriotic education bases, conducting social research, participating in volunteer services, and other forms of activities, allowing students to experience the essence of ideological and political education in practice and strengthening their sense of social responsibility and mission. At the same time, it is essential to strengthen the development of ideological and political education courses. This includes optimizing the curriculum, enriching teaching content, and integrating the latest theoretical achievements and practical experiences into teaching. Diverse teaching methods, such as case studies, group discussions, and role-playing, should be adopted to stimulate students' interest and initiative, thereby improving teaching effectiveness. Furthermore, a positive campus cultural atmosphere should be fostered by integrating ideological and political education into campus culture construction. Through various cultural activities, academic lectures, thematic class meetings, and other events, positive energy can be disseminated, and core socialist values can be promoted, allowing students to be subtly influenced and educated. Ideological and political education is a vital part of higher education and plays an irreplaceable role in cultivating well-rounded socialist builders and successors who are developed morally, intellectually, physically, aesthetically, and labor-wise. Higher education institutions and teachers should attach great importance to ideological and political education, continuously explore innovations, and effectively improve its quality and level, laying a solid ideological foundation for students' growth and development.

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

2.1. The Fundamental Core of Higher Education is to Educate and Cultivate Talent

In the higher education system, structural chemistry, as an important branch of natural sciences, holds profound significance when integrated with ideological and political education. Firstly, the research content and methodology of structural chemistry can cultivate students' scientific spirit and rational thinking, while ideological and political education emphasizes the development of moral character and a sense of social responsibility. The combination of the two contributes to the formation of a well-rounded quality structure in students. Secondly, in the face of a complex and ever-changing global social environment, integrating ideological and political education into structural chemistry teaching can guide students in establishing a correct worldview, outlook on life, and values, enhancing their ability

to resist negative ideologies. Finally, through practical examples in structural chemistry, such as the history of quantum mechanics, molecular symmetry, and chemical bond formation, ideological and political concepts like teamwork and innovative thinking can be vividly illustrated. This allows students to enhance their comprehensive qualities while learning professional knowledge, laying a solid foundation for becoming well-rounded socialist builders and successors with moral, intellectual, physical, aesthetic, and labor development [3,4,5]. Therefore, integrating structural chemistry with ideological and political education is an essential requirement for improving education quality and cultivating a new generation capable of meeting the demands of the times.

2.2. The Role of Integrating Ideological and Political Elements in Promoting Students' Holistic Development

Integrating ideological and political elements into the teaching of structural chemistry plays a significant role in promoting students' holistic development. Through ideological and political education, students can gain a deeper understanding of the social responsibilities and ethical considerations behind chemical knowledge, fostering a rigorous scientific attitude and a strong sense of social responsibility. This sense of responsibility will inspire students to adhere to the principles of people-orientedness and social service in their future scientific research and professional careers.

On the other hand, the ideals, beliefs, and values emphasized in ideological and political education provide students with powerful spiritual motivation, helping them establish a correct worldview, outlook on life, and values. This not only enhances students' moral and ethical qualities but also stimulates their enthusiasm for learning and innovative abilities, laying a solid foundation for realizing both personal and social values. It is of great significance for cultivating high-quality chemistry talents who are both ethically and professionally competent.

In specific teaching practices, teachers can explore the ideological and political elements inherent in structural chemistry based on its disciplinary characteristics. For example, when explaining molecular structures and chemical bonds, students can be guided to reflect on the relationship between the rational use of chemical substances and environmental protection. This helps students recognize that the development of science and technology should be aligned with ecological balance, cultivating their environmental awareness and concept of sustainable development. When introducing crystal structures, the outstanding contributions of Chinese scientists in related fields can be highlighted to inspire students' national pride and patriotic spirit. At the same time, students can be encouraged to explore courageously and innovate boldly, contributing to the nation's scientific and technological progress. Additionally, teachers can organize group discussions, allowing students to share their understanding of chemical knowledge and social responsibilities through communication. This fosters teamwork and communication skills. Through teaching methods such as case studies and experimental inquiry, students can experience the rigor and practicality of science in practice, enhancing their sense of social responsibility and mission. In summary, integrating ideological and political elements into the teaching of structural chemistry is an important approach to cultivating high-quality talents who are both ethically and professionally competent. Teachers should continuously explore and innovate teaching methods,

fully leveraging the educational function of structural chemistry courses to contribute positively to students' holistic development and societal progress.

3. Mining Ideological and Political Resources in Structural Chemistry Courses

3.1. Ideological and Political Elements in the History of Structural Chemistry

From early atomic valence theories to modern quantum chemistry, scientists have continuously explored the mysteries of material structures, reflecting humanity's relentless pursuit of the unknown. This spirit of exploration itself serves as a valuable ideological and political resource, inspiring students to dare to explore and innovate. Throughout the development of structural chemistry, scientists have driven scientific progress through continuous experimentation and theoretical innovation [6]. This spirit of practice aligns with Marxist theory of practice, emphasizing the importance of practical engagement in understanding and transforming the world. At the same time, the theories of chemical bonds in structural chemistry embody profound philosophical thinking. The existence of covalent and ionic bonds reveals the relationship of unity of opposites between things. This dialectical thinking helps students develop a scientific worldview and methodology. Therefore, integrating these ideological and political elements into the teaching of structural chemistry can not only enrich the content of instruction but also guide students in establishing a correct scientific outlook and perspective on life, fostering their innovative spirit and practical abilities. This lays a solid foundation for future scientific research and social development.

Thus, integrating ideological and political education into the teaching of structural chemistry holds significant meaning and value. It not only enables students to acquire professional knowledge but also cultivates their scientific thinking, innovative capabilities, and correct worldview, outlook on life, and values. By studying structural chemistry, students can understand the relationship between the microstructure and properties of substances, thereby gaining a deeper insight into the laws of nature. In this process, guiding students to reflect on the purpose and significance of scientific research helps them realize that science is not only about pursuing knowledge but also about driving social progress and human development. For example, when introducing the structures and properties of new materials, students can learn about the applications of these materials in fields such as energy, environment, and healthcare. This can inspire a sense of social responsibility and mission in students. Additionally, the history of structural chemistry is filled with stories of scientists' perseverance and dedication. In the face of difficulties and challenges, they consistently maintained their passion for and pursuit of science. These stories can serve as vivid case studies for ideological and political education, motivating students to courageously confront challenges and persistently pursue their dreams in both study and life. For instance, Marie Curie's discovery of radium under extremely difficult conditions serves as an inspiring example of resilience and determination for future generations. Integrating ideological and political education into the teaching of structural chemistry can fully leverage the educational function of this course. It helps cultivate high-quality talents with a strong sense of social responsibility, innovative spirit, and practical abilities, contributing to the realization of the Chinese Dream of the great rejuvenation of the Chinese nation.

3.2. Philosophical Concepts in the Principles of Structural Chemistry

The principles of structural chemistry contain rich philosophical ideas. The fundamental assumptions of quantum mechanics and the elegant simplicity of the Schrödinger equation demonstrate the unity and conciseness of natural laws, prompting reflection on the essence and workings of the universe. The description of electron clouds and the introduction of the four quantum numbers reveal the complexity and uncertainty of the microscopic world, challenging the deterministic views of classical mechanics and encouraging students to contemplate the relationship between free will and destiny. At the same time, concepts such as atomic orbitals, chemical bonds, and molecular structures in structural chemistry highlight the decisive role of microscopic structures in determining macroscopic properties. This reflects the philosophical idea that “formless entities define the essence, while tangible entities define the utility.” These principles not only explain chemical phenomena but also inspire profound insights into the nature of things and their interrelationships. In the teaching process, instructors can incorporate these philosophical concepts to guide students in reflecting on the philosophical implications of scientific principles, fostering critical thinking and innovative abilities. By integrating the principles of structural chemistry with philosophical ideas, students can not only deepen their understanding of chemical knowledge but also broaden their perspectives and enhance their comprehensive qualities.

3.3. Fostering a Sense of Social Responsibility Through the Applications of Structural Chemistry

Structural chemistry not only unravels the mysteries of matter at the microscopic level but also provides a theoretical foundation for the development of new materials and energy sources. As learners of chemistry, it is essential to recognize that every transformation of scientific research achievements may have profound societal impacts. Therefore, the teaching of structural chemistry should emphasize cultivating students' sense of social responsibility. This includes paying attention to the ethical boundaries of scientific research achievements, ensuring that technological applications do not harm public interests; actively participating in solving social issues such as environmental protection and energy sustainability by applying acquired knowledge to contribute to societal well-being; and maintaining a reverence for scientific research to avoid prioritizing profit over potential risks. Through such education, we can cultivate chemistry professionals who possess both specialized skills and high moral character, contributing to the sustainable development of society.

To better foster students' sense of social responsibility in the teaching of structural chemistry, instructors can employ various teaching methods and approaches. For example, incorporating real-world case studies into classroom teaching allows students to analyze the structural chemistry knowledge involved and the related social and ethical issues. This approach enables students to gain a deeper understanding of the close connection between science, technology, and society, thereby enhancing their sense of social responsibility. Additionally, teachers can organize students to participate in social practice activities, such as visits to chemical plants or environmental protection enterprises. These experiences allow students to witness firsthand the application of chemical knowledge in actual production and understand the impact of the chemical industry on the environment and society. During these activities, guiding students to reflect on how to balance economic

benefits with environmental protection and sustainable development goals can help cultivate their practical abilities and sense of social responsibility.

3.4. Research Ethics Education in Structural Chemistry Laboratory Teaching

In structural chemistry laboratory teaching, research ethics education is an indispensable component. Chemical ethics define the values, social responsibilities, and behavioral norms that chemistry professionals and their communities should adhere to. When conducting chemical experiments, researchers must uphold honesty and integrity, avoiding exaggeration of research findings or fabrication of data to ensure the credibility of their work. Additionally, they should respect and protect intellectual property rights, refraining from stealing or plagiarizing others' research achievements to maintain the fairness and independence of scientific research. In laboratory teaching, instructors should emphasize the accuracy of data processing and analysis, guiding students to adopt scientific methods to ensure the integrity and reliability of data. Furthermore, the rational use of research funds, with attention to efficiency and management while avoiding waste, is an ethical principle that every chemistry researcher should follow. Research ethics education should also include fostering environmental awareness, encouraging students to pay attention to waste disposal and resource conservation during experiments to minimize environmental pollution.

Through research ethics education in structural chemistry laboratory teaching, students' scientific literacy and sense of responsibility can be cultivated, laying a solid ethical foundation for their future careers in chemical research. This education is not only relevant to individual professional development but also crucial for the advancement of science and technology and the construction of ethical standards in society as a whole.

4. Specific Practices of Integrating Ideological and Political Elements in Structural Chemistry Teaching

4.1. Designing Teaching Cases with Ideological and Political Elements

In structural chemistry teaching, designing teaching cases that incorporate ideological and political elements is crucial. For example, when explaining molecular structures and properties, instructors can introduce the outstanding contributions of Chinese scientists in the field of structural chemistry, such as Tu Youyou's discovery of the structure of artemisinin. This highlights the patriotic spirit and sense of national pride in scientific exploration [7]. Additionally, China's achievements in new energy research, such as significant breakthroughs in the development of new battery materials, can be introduced. These accomplishments not only demonstrate China's strength in technological fields but also reflect its commitment to sustainable development. By discussing these achievements, students can understand the importance of technological innovation for national development, fostering their innovative mindset and sense of responsibility. When teaching crystal structures, instructors can use ancient Chinese bronze manufacturing techniques as a starting point. The exquisite craftsmanship of ancient Chinese bronze ware and the study of its crystal structure are of great significance for understanding ancient civilizations and technological development. By connecting ancient techniques with modern crystallography knowledge, students can appreciate the wisdom of the Chinese nation and the charm of traditional culture, thereby enhancing their cultural confidence.

Furthermore, when discussing the relationship between material structure and properties, students can be guided to focus on China's demand for high-performance materials in fields such as high-speed rail and aerospace. The rapid development of these areas relies heavily on advancements in materials science. Through case studies, students can recognize the close connection between science and technology and national development, stimulating their motivation to learn and sense of mission. This encourages them to contribute to the nation's scientific and technological progress. By deeply integrating ideological and political elements and combining professional knowledge with ideological education, students' comprehensive qualities can be cultivated, enabling them to become new-era talents with patriotic spirit, innovative mindset, and social responsibility.

4.2. Natural Integration of Ideological and Political Content in Classroom Teaching

In classroom teaching, the integration of ideological and political content should be subtle and natural, like a gentle breeze or mild rain that moistens everything silently. By analyzing the philosophical ideas embedded in chemical structures, such as the harmonious coexistence of atoms and molecules, students can be guided to understand the dialectical unity in nature [8]. At the same time, combining stories of scientists from the history of chemistry, such as Marie Curie's relentless pursuit of science, can inspire students' patriotic sentiments and determination to strive for excellence. When explaining specific chemical principles, teachers can also introduce China's major achievements in the field of structural chemistry, such as the development of new crystalline materials, to enhance students' national pride and confidence. Additionally, by discussing the impact of chemical structures on the environment, students can be guided to adopt green chemistry concepts and develop a sense of social responsibility. This natural integration approach ensures the systematic delivery of structural chemistry knowledge while effectively enhancing students' ideological and political awareness, achieving an organic unity of knowledge impartation and value guidance.

4.3. Integrating Ideological and Political Education in Experimental Teaching

In the experimental teaching of structural chemistry, ideological and political education can be skillfully integrated. Through experimental demonstrations and hands-on practice, students can intuitively experience the mysteries of the chemical world. At this point, teachers can guide students to combine scientific spirit with ideological and political concepts. On one hand, teachers can emphasize the rigor and accuracy of experimental operations, cultivating students' scientific attitude of seeking truth from facts. This aligns with the spirit of honesty, integrity, and rigorous scholarship emphasized in ideological and political education. On the other hand, when facing difficulties and challenges during experiments, teachers can encourage students to persevere and explore courageously. This not only fosters students' scientific exploration spirit but also embodies the qualities of resilience and self-improvement emphasized in ideological and political education. Additionally, teachers can combine experimental content to share stories of chemists who have made significant contributions to the nation and its people through their research, inspiring students' patriotic sentiments and sense of social responsibility. This allows ideological and political education to be naturally integrated into experimental teaching.

4.4. Extending and Expanding Ideological and Political Education Through Extracurricular Activities

In the teaching of structural chemistry courses, extracurricular activities serve as an important platform for extending and expanding ideological and political education. By organizing diverse activities such as chemistry knowledge competitions, chemistry research groups, and popular science lectures, students can not only deepen their understanding of structural chemistry theories but also experience the scientific spirit and patriotic sentiments in practice. In chemistry knowledge competitions, setting questions related to national conditions and current events can guide students to pay attention to the nation's scientific and technological development, enhancing their sense of national pride [9]. Chemistry research groups encourage students to participate in scientific research projects, fostering innovative thinking and practical abilities while emphasizing teamwork and dedication. Popular science lectures invite experts and scholars in the field of chemistry to share their research experiences and achievements [10,11], inspiring students' scientific interest and sense of social responsibility. These extracurricular activities not only enrich students' extracurricular life but also subtly integrate ideological and political education, enabling students to appreciate scientific truths in practice and establish a correct worldview, outlook on life, and values. This lays a solid foundation for cultivating outstanding talents with scientific literacy and social responsibility.

5. Evaluation and Optimization of Ideological and Political Teaching Effectiveness in Structural Chemistry Courses

5.1. Construction of an Evaluation System for Ideological and Political Teaching Effectiveness

In constructing an evaluation system for the effectiveness of ideological and political education in structural chemistry courses, a multi-dimensional and comprehensive approach should be emphasized. First, the evaluation system must cover students' mastery of theoretical knowledge, assessed through final exams, chapter assignments, and quizzes. Second, it should focus on evaluating students' critical thinking, language expression, and analytical and summarizing abilities, which can be achieved through tasks such as short essays and classroom discussions. Additionally, the evaluation system should pay attention to changes in students' learning attitudes, the stimulation of their learning interest, and the enhancement of their innovative awareness and thinking. These aspects can be comprehensively assessed through student feedback and self-reflection. During the evaluation process, a diversified and dynamically developing evaluation strategy should be adopted, emphasizing process assessment and the principle of continuous improvement. Furthermore, diverse assessment methods should be established to ensure the objectivity and accuracy of evaluation results. Through the construction of this system, the effectiveness of ideological and political education in structural chemistry courses can be comprehensively and objectively reflected, providing a strong basis for further optimizing teaching methods and approaches. At the same time, it will help enhance students' professional competence and moral literacy, achieving the educational goal of fostering virtue through education.

5.2. Tracking and Feedback on the Improvement of Students' Ideological and Political Literacy

In the process of evaluating and optimizing the effectiveness of ideological and political education in structural chemistry courses, the improvement of students' ideological and political literacy is a crucial assessment indicator. To this end, we have established a comprehensive tracking and feedback mechanism for students. Through regular questionnaires, classroom interaction observations, and after-class exchanges, we continuously collect data on students' acceptance and depth of understanding of the ideological and political content in the course. The results show that after systematic learning, students not only consolidate their professional knowledge of chemistry but also significantly enhance their ideological and political literacy, including patriotic sentiment, scientific spirit, and sense of social responsibility. Additionally, we encourage students to provide valuable feedback to continuously optimize course content and teaching methods. Their positive feedback and suggestions offer strong support for further integrating ideological and political elements into structural chemistry courses. In the future, we will continue to refine the tracking and feedback mechanism to ensure the sustained improvement of students' ideological and political literacy, contributing to the cultivation of well-rounded socialist builders and successors who are developed morally, intellectually, physically, aesthetically, and labor-wise.

5.3. Training and Enhancement of Teachers' Ideological and Political Teaching Abilities

In the evaluation and optimization of ideological and political teaching effectiveness in structural chemistry courses, the training and enhancement of teachers' ideological and political teaching abilities are of utmost importance. Universities should regularly organize specialized training sessions, inviting experts in ideological and political education and scholars in the field of chemistry to collaboratively explore how to naturally integrate ideological and political elements into structural chemistry teaching. Through workshops, seminars, and other formats, experience exchange and sharing among teachers should be promoted to enhance their theoretical and practical levels in ideological and political education. Teachers should be encouraged to participate in innovation competitions for ideological and political course design and teaching methods to stimulate their teaching creativity. Simultaneously, an evaluation system for teachers' ideological and political teaching abilities should be established, incorporating the effectiveness of ideological and political teaching into teachers' performance assessments to motivate continuous improvement. Through ongoing training and incentive mechanisms, a teaching team proficient in both chemical professional knowledge and ideological and political education will be built, providing solid support for the continuous optimization of ideological and political teaching in structural chemistry courses.

5.4. Continuous Improvement Pathways for Ideological and Political Education in Structural Chemistry Courses

To continuously enhance the effectiveness of ideological and political education in structural chemistry courses, clear pathways for ongoing improvement must be established. First, a feedback mechanism should be implemented to regularly collect opinions on the ideological and political teaching through student evaluations and peer reviews, enabling timely identification of issues and shortcomings. Second, based on the feedback, dynamic adjustments should be made to teaching content, methods, and approaches to ensure the organic integration of ideological and political

elements with chemical knowledge. Simultaneously, faculty development should be strengthened to improve teachers' ideological literacy and teaching abilities, providing robust support for ideological and political education. Additionally, diverse teaching models, such as case-based teaching and project-driven learning, should be explored to stimulate students' interest and initiative in learning [12]. Finally, a comprehensive evaluation system should be constructed to scientifically assess the effectiveness of continuous improvements in ideological and political teaching, ensuring steady progress in teaching quality. Through these measures, the ongoing optimization and development of ideological and political education in structural chemistry courses can be effectively promoted.

6. Conclusions

As a crucial foundation for cultivating talent in higher education institutions, the restructuring of ideological and political elements in courses holds profound significance. In today's era, cultivating high-quality talents with a strong sense of social responsibility, innovative spirit, and practical abilities is an important mission of higher education. The restructuring of ideological and political elements in specialized courses is one of the effective pathways to achieve this mission.

Taking the structural chemistry course as an example, this course not only covers a wealth of chemical knowledge and theories but also contains numerous ideological and political elements. By exploring these elements, such as scientists' spirit of exploration, teamwork, and persistent pursuit of scientific truth, students can gain intellectual inspiration and moral cultivation while learning professional knowledge. Integrating ideological and political education into the teaching of structural chemistry is a task of great significance. Through this approach, the teaching content can be enriched, teaching quality can be improved, and students' comprehensive qualities can be cultivated, promoting their well-rounded development. At the same time, it also helps enhance teachers' awareness and ability in implementing ideological and political education in courses, driving their professional growth and self-development. It is believed that with the joint efforts of educators, ideological and political education in courses will play an even more important role in higher education, making greater contributions to cultivating well-rounded socialist builders and successors who are developed morally, intellectually, physically, aesthetically, and labor-wise.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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References

- [1] Dou, H. Research on the Improvement of Network Ideological and Political Education Ability of University Counselors in the Post-Pandemic Era. *High. Educ. Res.* 2022, 7(5), 167-173, DOI: 10.11648/j.her.20220705.15.
- [2] Cleo, H. Theory and Practice: On the Role of Empirically Based Theory for Critical Practice. *Amer. J. Educ.* 1985, 94(1). DOI: 10.1086/443831.
- [3] Jianyue, J.; Nana, Z.; Xingmin, Y. Questionnaire Survey and Analysis on the Implementation of Curriculum Ideological and Political Education for Postgraduates Majoring in Economics. *High. Educ. Res.* 2022, 7(4), 113-119. DOI: 10.11648/j.her.20220704.13.
- [4] Brandy, G.; Jin-Kyoung, H.; Novell, E.; Elham, Z.; Dandan, Y.; Khamia, B. Using Assessment to Improve the Accuracy of Teachers' Perceptions of Students' Academic Competence. *Elem. Sch. J.* 2021, 121(4). DOI: 10.1086/714083.
- [5] Haifaa, M.; Athar-Haj, Y. Beyond the Language: Arabic Language Textbooks in Arab-Palestinian Society as Tools for Developing Social-Emotional Skills. *Educ. Sci.* 2024, 14(10), 1088. DOI: 10.3390/educsci14101088.
- [6] Sophia, R.; Benjamin, R.; Leticia-Villarreal, S. School Social Workers as Nepantleras in Equity Work for Immigrant Students: A Conceptual Exploration. *Soc. Serv. Rev.* 2020, 94(4). DOI: 10.1086/712044.
- [7] Xiaoqing, J.; Changzhi, W.; Nianqiang, L.; Lingyin, W.; Yue, Zhao.; Xiaoqian, Fu. Innovation and Practice of Values Education Through Curriculum in the Course of Electromagnetic Fields and Electromagnetic Waves. *High. Educ. Res.* 2023, 8(3), 80-86. DOI: 10.11648/j.her.20230803.13.
- [8] Mathias, O.; Lasse, L.; Michael-Bang, P. The Psychophysiology of Political Ideology: Replications, Reanalyses, and Recommendations. *J. Polit.* 2022, 84(1). DOI: 10.1086/714780.
- [9] Nan, Z.; Liping, Z.; Lujiang, H.; Jing, Zhang.; Shigan, Y. Excavation and Practice of Ideological and Political Elements in the Science and Engineering Specialized Courses. *Sci. J. Educ.* 2023, 11(1), 25-30. DOI: 10.11648/j.sjedu.20231101.14.
- [10] Fagundo-Rivera, J.; Romero-Castillo, R.; Garrido-Bueno, M.; Fernández-León, P. Innovative Methodologies in University Teaching: Pilot Experience of an Escape Room in Nursing Students. *Educ. Sci.* 2024, 14(10), 1097. DOI: 10.3390/educsci14101097.
- [11] Fayeze, K. The Degree of Kindergarten Teachers' Practice, in Gaza Governorates, of the Skills of Enhancing Creative Thinking and the Ways to Develop Them. *Educ. Sci.* 2016, 5(2), 12-26. DOI: 10.11648/j.edu.20160502.11.
- [12] Charles, B.; Irene, G.; Prabhakar-Rontala, S. Enhancing Learning Engagement: A Study on Gamification's Influence on Motivation and Cognitive Load. *Educ. Sci.* 2024, 14(10), 1115. DOI: 10.3390/educsci14101115.



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