

Research on Strategies to Improve the Quality and Efficiency of Middle School Chemistry Classrooms under the Background of “Double Reduction”

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Abstract:

In 2021, China introduced the “Double Reduction” policy, with the core goal of comprehensively reducing students’ academic pressure, implementing the educational purpose of fostering virtue through education, and promoting students’ comprehensive growth and healthy progress. This paper is based on enhancing teachers’ professional abilities, stimulating students’ active learning spirit, and cultivating their comprehensive literacy, exploring effective strategies to improve the quality and efficiency of middle school chemistry teaching. The research results show that teachers’ updating of teaching concepts, innovation of teaching methods, and guidance for students to change their learning styles are key to enhancing the quality of chemistry classroom education. This study aims to provide a theoretical basis for the teaching practice of middle school chemistry teachers.

Keywords:

Double Reduction Policy, Middle School Chemistry Classroom, Improving Quality and Efficiency

1. Introduction

In modern society, education is highly valued. However, with the rapid development of education, fierce academic competition has also emerged. Students in compulsory education are bearing an increasing academic burden and extracurricular training pressure, which has a negative impact on their physical and mental health and comprehensive growth. In response to this challenge, China has implemented the “Double Reduction” policy. During the implementation of the policy, teachers’ misunderstanding of the policy, coupled with students’ outdated learning concepts, have posed significant challenges to teaching. This article aims to explore how to effectively improve the quality of middle school chemistry classroom teaching and maximize teaching outcomes under the “Double Reduction” policy background by

refreshing teachers' teaching concepts, innovating teaching methods, and changing students' learning patterns [1].

To address the above issues, this study introduces strategies aimed at enhancing both "quality improvement" and "efficiency enhancement", focusing on the perspectives of teachers and students. Teachers must embark on transforming traditional educational paradigms, enriching their subject teaching expertise, constructing a holistic teaching framework, and implementing diversified designs and assessments for chemistry homework. In the new era, teachers ought to delve profoundly into the nuances of teaching content, consistently innovating teaching methodologies to align with evolving requirements. of education. Students need to enhance their interest in learning, strengthen their self-motivation, and refine their practical abilities as well as classroom participation. Students should actively participate in classroom discussions, take the initiative to explore the boundaries of knowledge, and cultivate critical thinking and problem-solving skills. Teachers should actively create a student-centered classroom environment, using situational teaching, cooperative learning, and other teaching strategies to stimulate students' enthusiasm for learning and exploration desire, and cultivate students' scientific literacy. Educators should create engaging experiments and projects that encourage students to apply theoretical knowledge to solve real-world problems, as evidenced by studies indicating that such practices enhance student understanding and motivation in chemistry, thereby deepening students' understanding and interest in the chemistry subject. In teaching practice, we should explore ways to improve the quality and efficiency of chemistry classrooms that adapt to the "Double Reduction" policy. Through the implementation of these strategies, we can alleviate the academic workload of students, foster their holistic development, and improve their overall quality, as evidenced by the varying outcomes observed in different regions and student groups.

2. The Core Problems Faced by the Current Situation of Middle School Chemistry Teaching

2.1. Teachers have deviations in mastering classroom tasks under the background of "Double Reduction" policy

Since the implementation of the "Double Reduction" policy, the quality of teaching has generally improved. However, some teachers have misinterpreted the policy's intent, placing undue emphasis on 'reducing burdens' at the expense of classroom effectiveness. Consequently, this has resulted in vague teaching goals, unsuitable teaching methods, and disjointed teaching processes, ultimately impacting students' focus and hindering the enhancement of classroom efficiency. In this context, we see that although students' burdens have been reduced in the classroom, the depth and breadth of learning have been correspondingly limited. In the process of pursuing the reduction of homework and after-school tutoring, some studies have shown that some educators may, to a certain extent, neglect the core principles of education: stimulating students' curiosity and cultivating their cognitive and problem-solving abilities. In the classroom, the vivid discussions and interactions that should have existed are becoming fewer and fewer. Instead, rote learning of knowledge and monotonous teaching methods take their place. This approach not only diminishes students' enthusiasm for learning but also hinders their ability to adjust to future societal demands for innovation and critical thinking. Therefore, teachers need to re-

examine the true intent of the “Double Reduction” policy, find a balance between reducing burdens and improving teaching quality [2].

2.2. The educational concept has not achieved modernization transformation, and the teacher-student interaction is insufficient in the teaching process

Under the background of the “Double Reduction” policy, chemistry teaching remains teacher-centered, fostering a passive learning approach among students. Some parents and teachers still overemphasize scores, which leads students to mechanically absorb knowledge. In the traditional teaching model, teachers play the role of knowledge transmitters, while students are passive recipients of knowledge, a model that limits students’ initiative in learning. In daily learning life, many students are accustomed to the learning style where ‘the teacher speaks, and they merely need to remember,’ a practice that starkly conflicts with the chemistry teaching espoused by the ‘Double Reduction’ policy. To ensure a comprehensive understanding and effective delivery of teaching content, teachers must update educational concepts, discard outdated didactic approaches and cramming methods, deeply comprehend the significance of the “Double Reduction” policy, prioritize reducing students’ burdens, while keeping focusing on teaching effectiveness. Whether a classroom is efficient largely depends on the frequency of interaction between teachers and students. Nonetheless, the issue of inadequate interaction persists in contemporary chemistry classrooms. Hence, there is a pressing need to revitalize the educational paradigm.

2.3. The potential value of homework has not been fully explored, and students face difficulties in linking knowledge systems during the construction process

Homework design is the process by which teachers, based on teaching goals and students’ actual conditions, comprehensively use educational and psychological theories to carefully plan the content and form of homework for students. Upon reviewing the present scenario of homework design, we observe that its format is somewhat monotonous, offering little variety, and predominantly consists of written tasks like assignments and textbook exercises. This not only results in students feeling bored but also significantly impacts their learning enthusiasm, hindering the development of students’ comprehensive literacy. The homogeneity of homework content, coupled with a lack of hierarchy and relevance, fails to adequately address individual differences among students, resulting in homework that is either too challenging for some or too easy for others, thereby impeding optimal learning outcomes. During the learning process, students frequently struggle to think independently when encountering problems, thereby failing to exercise their problem-solving skills. Completing homework seems to be just a mechanical task, lacking deep thinking, unable to achieve effective integration of knowledge and the construction of the chemistry knowledge system, thereby affecting the improvement of classroom efficiency. Despite students devoting considerable time to completing their homework, their logical thinking abilities remain clumsy. Homework serves not merely as a test of students’ mastery of knowledge, but also as a crucial means of nurturing their thinking and innovative abilities. Therefore, teachers ought to fully exploit homework as an invaluable teaching tool, propose a variety of solutions, and foster students’ divergent thinking and innovative awareness.

3. Key Strategies For Improving Quality and Efficiency

3.1. Enhance teachers' subject teaching ability and build a complete teaching system

In an environment of implementing the “Double Reduction” policy, if teachers want to improve the quality and efficiency of chemistry teaching, they must adopt more in-depth reform measures. To ensure thorough mastery of teaching content, teachers must update educational concepts, discard outdated ‘didactic’ and ‘cramming’ methods, deeply comprehend the significance of the ‘Double Reduction’ policy, prioritize reducing students’ burdens, while maintaining a focus on teaching effectiveness. Teachers should clarify the goals of chemistry teaching, go beyond the perspective of solely pursuing grades, and gradually realize the transition from “teacher-led” to “student-led” teaching models. Moreover, teachers should recognize students’ dominant role and individual differences, implement differentiated teaching strategies to promote the full development of students’ potential [3].

Teachers need to enhance their expertise in chemistry, encompassing comprehension, application, experimental proficiency, and inquisitive mindset, alongside refining their teaching methodologies, experimental demonstrations, and guidance techniques. Educational departments and schools ought to furnish teachers with specialized instruction, arrange offline learning events, leverage online platforms for supplementary instruction, conduct regular competency evaluations to elevate research and curriculum planning standards, and promote teachers’ continuous growth. Teachers ought to embrace modern educational technology, including multimedia and online resources, thereby enriching their teaching methodologies and bolstering their instructional efficacy. Through these strategies, teachers can more effectively stimulate students’ enthusiasm for learning and achieve quality improvement and efficiency increase in chemistry teaching. For example, teachers can use online education platforms to provide students with a variety of learning materials. The integration of comprehensive learning resources and interactive tools in distance education empowers students to engage in independent learning anytime and anywhere, significantly enhancing the flexibility and convenience of the educational experience.

Teachers occupy a pivotal position in the realm of education, necessitating clarity in defining instructional objectives, meticulous selection of curricular materials, and the deployment of tailored pedagogical approaches. Certainly, reducing students’ burdens is a goal, but more crucially, it involves enhancing classroom efficiency and fostering a holistic advancement in students’ capabilities by personalizing teaching content and adopting diverse, innovative methods. Educators ought to adjust their instructional tactics based on student feedback, and ensure that teaching content closely aligns with students’ actual situations, thereby significantly enhancing the relevance and effectiveness of the teaching process. In this process, teachers should serve as inspired guides and enthusiastic promoters, igniting students’ passion for learning and fostering within them a strong desire for knowledge and a deep love for learning. Through these innovative teaching practices, teachers can empower students to master knowledge in a relaxed atmosphere, nurture their problem-solving abilities, and ultimately achieve remarkable academic and personal growth.

3.2. Enhance students' enthusiasm for studying chemistry and improve their subjective initiative in the learning process

The key to stimulating students' enthusiasm lies in their active participation. Traditional teaching methods often make chemistry learning a dull process of rote memorization. We advocate the student-centered teaching model that flexibly utilizes classroom scenarios, seamlessly integrates students' interests and current hot topics into the curriculum, and establishes diverse teaching segments to captivate students' attention. At the same time, teachers ought to devise innovative teaching activities, like chemistry experiments and scientific exploration projects, enabling students to acquire knowledge through hands-on practice and enhance their comprehension of chemical concepts through personal encounters. For example, teachers can organize outdoor chemistry experiments for students to observe chemical phenomena in a natural environment, thus stimulating their curiosity and desire for exploration.

Under the "Double Reduction" policy, chemistry experiments are a very effective means to achieve quality improvement and efficiency enhancement in chemistry classrooms. Hands-on experience from chemistry experiments enhances the understanding and mastery of chemical principles. "Practice is the sole criterion for testing truth," and in the process of practice, considering the safety of experiments and other factors, teachers can use multimedia technology to demonstrate experiments. For instance, teachers can demonstrate the experimental steps and phenomena of the "Investigation of Red Phosphorus Combustion" and students can gain a clear understanding of the experimental reaction, thereby facilitating subsequent teaching on the reaction's content. In this way, students not only learn knowledge but also enhance their inquiry abilities, which is beneficial for cultivating students' chemical thinking awareness and also helps to improve the quality and efficiency of chemistry classrooms [4].

Teaching is a key channel for teacher-student interaction and student-to-student communication. Teachers understand students' situation through dialogue and ask questions that are representative to stimulate cooperative learning, enhance classroom participation, achieve efficient learning, and thereby improve the effectiveness of classroom teaching. Teachers should encourage students to ask questions and engage in group discussions, fostering critical thinking. Students can enhance their thinking ability through interactive learning approaches. By employing these teaching strategies, students are encouraged to participate more actively in classroom activities, subsequently boosting both learning efficiency and quality.

3.3. To achieve interesting and efficient chemical homework design

Homework is the practical application of classroom knowledge. Nowadays, many students do not like to complete homework, pretending to complete homework, or copy homework. Hence, teachers can consider incorporating interesting elements into homework assignments. Homework that is intriguing can spark students' curiosity in chemistry and motivate them to actively delve into chemical knowledge and explore learning techniques. Students gradually break through the key points and difficulties in learning, and achieve comprehensive improvement. When assigning homework, teachers can also apply modern technology, incorporating a game-like element into the homework to attract students to complete it efficiently.

Teachers should recognize each student's strengths and weaknesses in completing homework, guiding students to efficiently complete homework according to their preferences and effective methods. Design practical homework that allows students to participate hands-on, stimulating learning passion and improving thinking skills. After

learning the knowledge points, students are encouraged to independently extend, showcasing and sharing through forms such as posters and speeches, expanding their chemical horizons, achieving interdisciplinary knowledge integration, and improving teaching quality and students' comprehensive abilities. For example, students can combine chemical knowledge with environmental protection, discussing how to reduce pollution through chemical methods, raising environmental awareness, and cultivating students' sense of social responsibility.

3.4. To realize diversification and rationalization of teacher evaluation system

Teachers' evaluation of homework affects students' attitudes. Comprehensive evaluation methods are pivotal in measuring students' learning outcomes. They not only provide objective feedback to educators for refining teaching strategies but also foster individual development by offering insights into students' progress and potential. Such evaluations can encompass a variety of methods, such as tests for knowledge retention, project-based assessments for practical skills, and self-assessments for fostering self-awareness and autonomy in learning. Educators should embrace a developmental evaluation approach for homework assessment, emphasizing the monitoring of students' progress throughout the learning journey and employing formative evaluation techniques to inspire students to actively engage in completing their learning tasks. Teachers should comprehensively and objectively measure learning outcomes, accurately assess learning progress, and incorporate student self-evaluation and peer evaluation to cultivate a cooperative spirit. Teachers should select multiple evaluation criteria, scientifically and reasonably divide evaluation levels, and carry out hierarchical evaluation based on students' actual situations, increasing students' confidence. For example, teachers can provide detailed homework feedback to students, pointing out their strengths and areas for improvement, helping students clarify learning goals and stimulate their motivation to learn.

To effectively gauge homework results, educators can leverage technological solutions, such as online homework platforms, enabling instant submission, grading, and homework feedback, thereby enhancing evaluation efficiency. Furthermore, educators can employ data analysis tools to delve deeply into students' homework data, gaining insights into learning traits and challenges, refining personalized instruction, and furnishing a foundation for chemistry classroom instruction. For instance, by scrutinizing typical errors among students' homework, teachers can promptly adjust teaching strategies and focus on explaining students' weak links, thereby improving the pertinence and effectiveness of teaching. Educators can leverage data analysis to uncover students' learning patterns and offer tailored educational recommendations.

4. Conclusions

Chemistry is a natural discipline and is closely related to our lives. The implementation of the "double reduction" policy is not only to reduce the academic burden of students, but also to implement quality-oriented education. Based on the present, this paper advocates that the "mass efficiency" strategy can fully embody the student-centered teaching idea, teachers change the old education idea, improve subject teaching quality, enhance students' subjective initiative, realize the chemical homework design hierarchy and diversification of measures, which is conducive to comprehensively and systematically improve the students' knowledge level and

practice ability, enhance the level of teachers' subject teaching, is advantageous to the students change ideas, improve the students' learning mode and method. Looking into the future, chemistry classroom will be more in line with the needs of the times and provide guarantee for the growth and progress of students.

Conflicts of Interest

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

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