

The Current Status of Elementary School Science Education in Jilin Province and Analysis of Its Influencing Factors

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Abstract: This study aims to analyze the current status of elementary school science education in Jilin Province and its influencing factors. Through in-depth investigation and analysis of science education resources, teaching methods, and teaching staff in different regions of Jilin Province, this paper reveals the characteristics and existing problems of elementary school science education in the province. In addition, this research explores various factors influencing elementary school science education in Jilin Province, including policy support, economic development level, regional culture, and societal attitudes. The study finds that elementary school science education in Jilin Province is influenced by multiple factors, with uneven distribution of educational resources, insufficient teaching staff, and limited teaching methods being the main issues. Based on these findings, this paper provides targeted improvement suggestions in the hope of offering guidance for the development of elementary school science education in Jilin Province and other regions in China.

1. Introduction

Education is the cornerstone of national development, and science education is particularly crucial as it not only cultivates students' scientific literacy but also stimulates their innovative capabilities and practical skills[1]. In China, with the deepening of education reforms, elementary school science education has gradually received more attention[2]. Especially in Jilin Province, a region with diverse geographical environments and varying levels of economic development, the current status of elementary school science education and its influencing factors warrant in-depth research[3].

Internationally, elementary school science education has become a research hotspot, and many countries are improving the quality of science education through curriculum reform, teaching methods, and teacher training[4]. Domestic scholars have also conducted extensive research on elementary school science education, but most of it has been focused on economically developed regions, with relatively limited research on less-developed areas like Jilin. Elementary school science education in Jilin Province is influenced by multiple factors such as resource allocation, geographical location, and socioeconomic status. The combined effect of these factors is of great significance for improving the quality of education[5].

Therefore, this study focuses on the current status of elementary school science education in Jilin Province, aiming to reveal its characteristics and existing issues through empirical research[6]. It also explores various factors influencing its development. This research has important theoretical and practical significance for understanding the impact of regional disparities on science education, optimizing resource allocation, and enhancing the quality of education[7-8].

2. Analysis of the Current Status of Elementary School Science Education in Jilin Province

When analyzing the current status of elementary school science education in Jilin Province, we need to focus on several key aspects rather than dividing them into subheadings. Firstly, the distribution of educational resources in Jilin Province shows significant urban-rural disparities. Schools in urban areas typically have better facilities and teaching materials, while rural schools are

relatively deficient in these aspects. This difference affects the quality of science education and the learning experiences of students[9].

In terms of teaching methods, elementary schools in Jilin Province generally employ traditional teacher-centered, textbook-centric teaching approaches[10]. While this approach ensures a basic quality of education to some extent, it restricts students' active exploration and the cultivation of innovative thinking. Although some schools have begun to experiment with more interactive and inquiry-based teaching, such reforms are not widespread.

Teacher quality is another critical factor influencing the quality of science education. In Jilin Province, teachers in urban schools tend to have higher educational backgrounds and more teaching experience, while rural areas face issues of teacher attrition and inadequate professional training. These factors collectively impact students' effectiveness in learning science.

Furthermore, student engagement and interest are essential indicators of measuring the effectiveness of science education. In Jilin Province, due to limitations in resources and teaching methods, student participation in science courses is often low, particularly in resource-scarce areas where students lack sufficient opportunities for experiments and practical experiences. This further diminishes their interest in science learning.

In conclusion, the current status of elementary school science education in Jilin Province is influenced by various factors, including resource allocation, teaching methods, teacher quality, and student interest. To enhance the quality of science education, it is necessary to consider these factors comprehensively and implement corresponding improvement measures.

3. Factors Affecting the Current Status of Elementary School Science Education in Jilin Province

3.1 Uneven Resource Allocation

The resource allocation for elementary school science education in Jilin Province exhibits significant regional disparities. In urban areas, schools typically have access to more abundant science teaching resources, such as advanced laboratory equipment, rich teaching materials, and suitable learning environments. These resources contribute to improving the quality of science education, allowing students to have better access to and understanding of scientific knowledge.

In contrast, schools in rural and remote areas lag significantly behind in terms of science education resources. Schools in these areas often lack basic scientific laboratory equipment, and even basic teaching materials are challenging to secure. This scarcity of resources restricts the implementation of science education, lowers teaching effectiveness, and diminishes students' interest in learning.

Furthermore, the uneven distribution of resources is also reflected in teacher training and educational investments. Teachers in urban schools are more likely to receive training in modern teaching methods, while teachers in rural areas lack such opportunities. Additionally, unequal allocation of education budgets also affects the overall level of science education in various regions.

3.2 Teacher Professional Competence and Teaching Methods

Teacher professional competence is one of the key factors influencing the quality of science education. In Jilin Province, especially in rural and remote areas, teachers often lack a professional background in science education. This situation limits their ability to employ innovative and effective teaching strategies in science education, thereby affecting the quality of teaching and student learning outcomes (figure 1).

In addition to professional competence, the choice and application of teaching methods also have a significant impact on science education (figure 2). For a long time, elementary school science education in Jilin Province has primarily adopted a teacher-centered traditional teaching model that emphasizes knowledge transmission rather than students' active exploration. While this approach ensures coverage of knowledge to some extent, it restricts the cultivation of students' innovative thinking and practical skills.

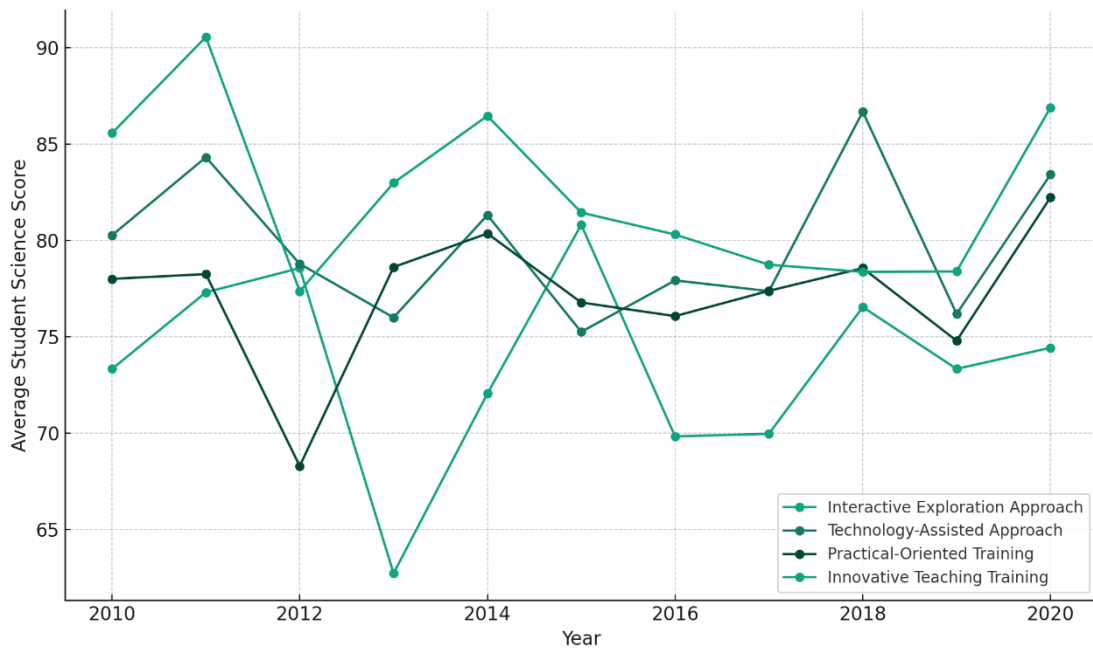


Figure 1 Impact of Teaching and Training on Scores

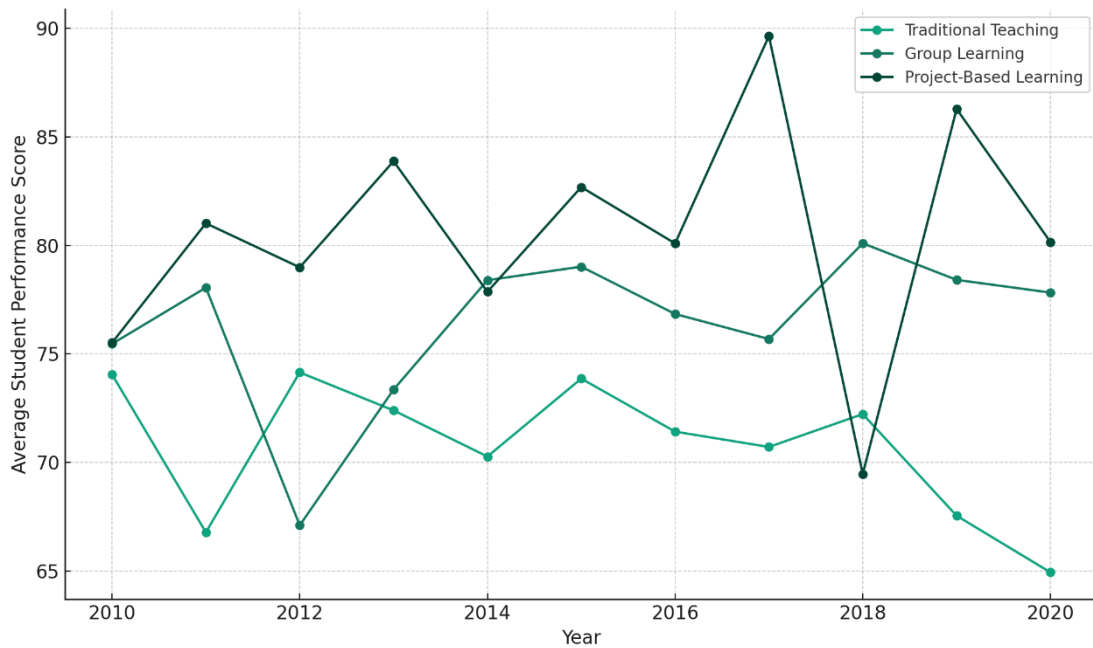


Figure 2 Effectiveness of Different Teaching Methods Over Time

In recent years, some schools have started to introduce more interactive and inquiry-based teaching methods to promote students' comprehensive development. This includes group cooperative learning, hands-on experiments, and project-based learning, aiming to stimulate students' interest in learning and enhance their practical abilities. However, the widespread adoption of such teaching methods still faces many challenges, including insufficient teacher professional training, limitations in teaching resources, and the influence of traditional educational beliefs.

Furthermore, the acceptance and application of new teaching concepts by teachers are also important factors affecting teaching method reform. In Jilin Province, improving teachers' science teaching abilities, especially in rural areas, requires more professional training and ongoing educational support. Only by enhancing teachers' professional qualifications and modernizing teaching methods can the overall level of science education be effectively raised.

3.3 Socioeconomic Factors and Cultural Influences

The current status of elementary school science education in Jilin Province is influenced by the dual impact of socioeconomic factors and cultural influences. Firstly, in terms of socioeconomic factors, varying levels of economic development across different regions in Jilin Province have led to unequal distribution of educational resources. Some areas, due to their weaker economic foundations, struggle to provide sufficient educational resources, including textbooks, laboratory equipment, and teaching staff. Additionally, government financial support directly affects the quality and coverage of elementary school science education. Insufficient financial support may result in a lack of educational resources, affecting accessibility and quality of education. Furthermore, the economic status of students' families is also a significant factor, as economic poverty at home may lead to more learning obstacles for students, reducing their opportunities to engage in science education.

Secondly, in terms of cultural influences, different regions in Jilin Province have distinct cultural backgrounds and traditions. These regional cultural differences may lead to variations in educational content and methods. Students from different regions may have varying interests and attitudes towards science education, which can affect their academic performance. Moreover, societal cultural values also impact elementary school science education. Some communities may prioritize the cultivation of other subjects or skills over science education, which may lead to insufficient investment and lower quality in science education. Finally, cultural factors also involve language and communication. Students from different cultural backgrounds may possess different language abilities and communication skills, which can impact knowledge transmission and comprehension in science education.

Therefore, improving elementary school science education in Jilin Province requires a comprehensive consideration of socioeconomic factors and cultural influences. The government should implement corresponding policies and measures to ensure equitable distribution of educational resources, enhance educational quality, and pay attention to the economic status of students' families to alleviate their financial burdens. Additionally, respecting and integrating regional and societal cultural values is important, encouraging active student participation in science education to promote the comprehensive development of elementary school science education in Jilin Province. This will contribute to nurturing more scientifically literate future citizens who can contribute to the sustainable development of society and the economy.

4. Education Reform and Future Prospects

When it comes to improving the current status of elementary school science education in Jilin Province, education reform is a crucial component. The importance of education reform lies in its potential to bring innovation and progress to elementary school science education, helping to address current and future challenges. Firstly, the government and educational authorities should prioritize the formulation and implementation of education policies that support the needs of elementary school science education. This includes providing adequate educational resources, teacher training, and equitable allocation of educational finances. Clear and effective policy implementation is essential for driving education reform.

Secondly, education reform should encourage teachers to adopt innovative teaching methods. Elementary school science education can be enriched through experiments, inquiry-based learning, and practical applications of science, which can stimulate students' interest and engagement. To achieve this, educational authorities can provide teacher training and professional development opportunities to enable teachers to master the latest scientific knowledge and teaching techniques for better guidance of students.

In terms of future prospects, elementary school science education should place a stronger emphasis on STEM (Science, Technology, Engineering, and Mathematics) education. This helps cultivate students' comprehensive qualities and innovative abilities, making them better prepared for the demands of modern society and careers. Additionally, leveraging modern technology such as

virtual laboratories and online learning platforms can enhance the interactivity and visualization of science education, making learning more vivid and attractive. Emphasizing experiments and practical activities allows students to experience science firsthand, fostering experimental skills and scientific thinking, which aids in better understanding and applying scientific knowledge. Finally, interdisciplinary education should also be emphasized, integrating science education with other disciplines to promote interdisciplinary learning and enhance students' holistic thinking and problem-solving skills.

Through education reform and future prospects, elementary school science education in Jilin Province can better adapt to the evolving social and technological environment, providing students with a richer and more comprehensive science education and cultivating more competitive future citizens. This will provide strong support and impetus for the social and economic development of Jilin Province.

5. Conclusion

In conclusion, socioeconomic factors and cultural influences are key factors affecting the current status of elementary school science education in Jilin Province. To improve elementary school science education, the education department and government of Jilin Province need to implement a series of comprehensive measures.

Firstly, in terms of socioeconomic factors, the government should increase financial investment in elementary school science education to ensure the adequacy and equitable distribution of educational resources, especially in economically disadvantaged areas. This will help enhance the accessibility and quality of education. Additionally, measures should be taken to alleviate the economic burden on students from impoverished families to ensure they have equal learning opportunities. Secondly, cultural influences should also be given attention. The education department can formulate education policies that encourage the integration of regional cultures, making educational content and methods more inclusive and adaptable. At the same time, raising public awareness and importance of science education, promoting the transformation of societal cultural values, and making science education a societal consensus are essential. Lastly, the education department should focus on the training and recruitment of teaching staff to ensure the improvement of educational quality. Providing more teacher training and support and attracting high-quality science teachers, especially in economically disadvantaged areas, will help enhance the professionalism and quality of education.

In summary, to improve elementary school science education in Jilin Province, it is necessary to comprehensively consider socioeconomic factors and cultural influences and implement corresponding policies and measures. This will promote the comprehensive development of elementary school science education, nurture more scientifically literate future citizens, and contribute positively to the social and economic development of Jilin Province.

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Survey on the State of Science Education in Primary Schools in Jilin Province. Project Source: Scientific Research Project of the Jilin Provincial Department of Education. Project Number: JJKH20240973SK.

References

- [1] McNab B K .An analysis of the factors that influence the level and scaling of mammalian BMR[J].Comparative Biochemistry & Physiology Part A Molecular & Integrative Physiology, 2008, 151(1):5-28.DOI:10.1016/j.cbpa.2008.05.008.
- [2] Hofstein A , Lunetta V N .The laboratory in science education: Foundations for the twenty-first century[J]. Science Education, 2003, 88(1):28-54.DOI:10.1002/sce.10106.

- [3] Black A E , Deci E L .The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective[J].Science Education, 2000, 84(6).DOI:10.1002/1098-237X(200011)84:63.0.CO;2-3.
- [4] Osborne J .Book Reviews: Taking Science to School: Learning and Teaching Science in Grades K-8[J]. Eurasia Journal of Mathematics Science and Technology Education, 2007, 3(2):163-166. DOI:10.12973/ejmste/75393.
- [5] Pritchett L .Where Has All the Education Gone?[J].Social Science Electronic Publishing, 1996, 15(1581):367-391.Doi:10.1093/wber/15.3.367.
- [6] Sirard J , Trost S G , Dowda M ,et al.Calibration of the computer science and applications, Inc. physical activity monitor in preschool children[J].Education Economics, 2001, 5(2):169-183. DOI:10.1097/00005768-200105001-00819.
- [7] Kris-Etherton P , Eckel R H , Howard B V ,et al.AHA Science Advisory: Lyon Diet Heart Study. Benefits of a Mediterranean-style, National Cholesterol Education Program/American Heart Association Step I Dietary Pattern on Cardiovascular Disease.[J].Circulation, 2001, 103(13):1823. DOI:10.1161/01.CIR.103.13.1823.
- [8] Wink, Donald J .Science and Engineering Indicators 1998[J].Journal of Chemical Education, 1998, 75(9):1078. DOI:10.1021/ed075p1078.
- [9] Aant,Elzinga.The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies[J].Higher Education Policy, 1997.Doi:10.1016/S0952-8733(97)89702-4.
- [10] Anonymous.AMS Programs in Support of Science and Education Contribution Report[J]. Bull.amer.meteor.soc, 1996, 77(12):44. DOI:http://dx.doi.org/10.1175/1520-0477(1996)0772.0.CO;2.