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The Current Situation and Cultivation Strategies of Pupils' Interest in Science Learning—Take L School in X County as an Example

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Abstract: *With the continuous development of information technology, science and technology have become the key to the competition of comprehensive national strength of all countries in the world, and the strength of comprehensive national strength depends on the quality and quantity of talents.How to cultivate innovative talents in science and technology has become a major challenge facing education today.In the critical period of scientific enlightenment, primary school should stimulate students' interest in scientific learning, guide students to establish good scientific learning habits, improve their scientific thinking ability and scientific learning potential, and help students generate core literacy in science.This paper analyzes the theoretical connotation of interest in science learning. Taking L School in X County as an example, it investigates and understands the current situation of pupils' interest in science learning, analyzes the existing problems, and puts forward relevant solutions to provide valuable reference for science education and teaching in primary schools.*

Keywords: *primary school science; Interest in science learning; strategy*

With the development of the times, the demand of the society for scientific and technological innovative talents is gradually increasing, and the cultivation of talents depends on education. On September 11, 2020, General Secretary pointed out at the scientists' symposium that "talent is the first resource, and the fundamental source of national scientific and technological innovation lies in people. We should put education in a more important position, comprehensively improve the quality of education, and focus on cultivating students' innovation awareness and ability".[1]As a key period of basic education, primary school plays an invaluable role in the growth and future development of students. The Science Curriculum Standards for Compulsory Education (2022 Edition) (hereinafter referred to as "curriculum standards") clearly states that:" Science courses help students to maintain curiosity about natural phenomena, move from being close to nature to being close to science, initially understand the natural world as a whole, understand the relationship between science, technology, society and the environment, develop basic scientific abilities, form basic scientific attitudes and social responsibilities, and gradually establish a correct world outlook, outlook on life and values. It can lay a good foundation for students' future study, life and lifelong development ".[2]Therefore, the study of science courses needs to stimulate students' interest in learning, mobilize their subjective initiative, and improve students' ability to understand natural phenomena and solve problems in combination with their life experience[3]. Pupils are in a critical period of transformation from image thinking to abstract thinking. They have certain logical thinking ability and psychological calculation ability, have strong curiosity about natural phenomena, and like to think about problems. They are not satisfied with classroom knowledge and are eager to get more extracurricular development. On the basis of clarifying the connotation of primary school students' interest in science learning, this paper investigates the current situation of primary school students' interest in science learning in different sections of L School in X County, and proposes solutions to the existing problems to enrich the educational teaching theory and provide reference for primary school science teaching.

1. Theoretical Connotation of Pupils' Interest in Science Learning

1.1 Learning interest

Interest refers to the psychological tendency of people to know something or engage in certain activities. It is based on the need to know and explore external things, and is an important motivation to

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promote people to know things and explore truth. From the perspective of educational psychology, learning interest is a psychological characteristic that a person tends to understand, study and obtain certain knowledge, and it is an internal force that can promote people to seek knowledge.

1.2 Characteristics of science curriculum in primary schools

Science is the knowledge system formed by human beings on the basis of studying natural phenomena and discovering natural laws, as well as the cognitive process of acquiring these knowledge systems and the methods used in this process. Primary school science curriculum is a curriculum that reflects the nature of science, with the following characteristics.

(1)Fundamentality

Children have just entered the school age stage, and have strong plasticity in thinking mode, innovative spirit, innovative consciousness and practical ability. The primary school science curriculum mainly aims to guide students to understand some basic scientific knowledge related to daily life experience, cultivate students to form good scientific habits, preliminarily master scientific methods such as observation, investigation, comparison, classification and analysis, and be able to solve some simple practical problems.

(2)Practicality

Inquiry activity is an important way for students to learn science. Starting from their familiar daily life, students can stimulate their interest in science learning, enhance their feelings for science, and make the process of acquiring scientific knowledge also a process of understanding the nature of science and forming scientific inquiry ability by asking questions, acquiring knowledge, exchanging ideas with others, and experiencing hands-on and brain-provoking practical activities[4]. The practicality of scientific inquiry is reflected in many aspects, including students' small scientific production under the guidance of teachers, and students' small family experiments and some observations, measurements, model making, planting and breeding, and scientific surveys.

(3)Comprehensiveness

As a comprehensive science curriculum, the content of science curriculum in primary schools presents scientific knowledge and scientific methods from the four fields of material science, life science, earth and cosmic science, technology and engineering, aiming at the phenomenon around students. However, it is not a simple superposition of these fields. Different knowledge contents are linked and organically integrated, Reflect the essential method and thinking mode of natural science as a whole. For example, guided by 13 core concepts, students are helped to construct comprehensive scientific concepts, and on this basis, interdisciplinary concepts such as "matter and energy", "structure and function", "system and model", "stability and change" are generated.

1.3 Primary school students' interest in science learning

According to the connotation of learning interest, combined with the characteristics of science curriculum in primary schools, primary school students' interest in science learning refers to the behavioral tendencies and psychological characteristics shown by primary school students in the learning process of science curriculum, which is specifically reflected in the students' attitude to science learning, participation in scientific activities, and concern for scientific phenomena in daily life.

2. A survey of the current situation of primary school students' interest in science learning

This paper takes L School in X County as an example, and from September 2022 to December 2022, through classroom observation and questionnaire survey, we can understand the current situation of science learning interest of primary school students in different stages. Classroom observation mainly understands students' participation in science class and students' active degree of thinking. The questionnaire survey is mainly to understand the current situation of primary school students' interest in science learning from the settings of science courses in school courses, the behavior and frequency of students' interest in science in daily life, the teaching situation of science class and students' attitude to science learning. Through data statistics and result analysis, the current situation of pupils' interest in science learning in different school stages is as follows.

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2.1 Pupils' interest in science learning is phased

The survey found that there were significant differences in pupils' interest in science learning among grades, which decreased with grade growth. The number of lower grade pupils who like or prefer science lesson accounts for 88% of the total number of lower grade students surveyed, but with the increase of age, this rate is gradually declining. Eighty-three percent of younger students said learning about science was fun, while only 38 percent of middle and upper grades said the same. When encountering difficulties in the process of science learning, 56% of students in the first and second grades are willing to solve them by themselves or actively seek help from others, while only 25% of students in the middle and senior grades hold a positive attitude, and more students choose to ignore or escape. Although the survey of students in all grades shows that the vast majority of students like scientific experiments and some other scientific practice activities, 74% of senior students are not willing to spend too much time to experience the process of hands-on exploration to acquire scientific knowledge due to the heavy academic load, but choose to listen to the teacher's teaching or mechanical recitation to acquire knowledge. Because the process of scientific inquiry takes too much time. According to Piaget's theory of stage of cognitive development, students in lower grades are in the concrete operational stage, and the content of science courses at this time are mostly graphic, popular and easy to understand, which can easily stimulate the enthusiasm of students in lower grades. However, In the middle and high school years of primary school, the content of science course gradually becomes theoretical and abstract, and the increasing difficulty makes students need to mobilize more logical thinking, so students' interest in learning gradually weakens[5].

2.2 Inadequate attention to scientific things and phenomena in daily life

95% of the students in the survey are deeply convinced of the scientific facts that are generally recognized as common sense, rarely have the idea of "why", and lack the ability to ask questions from the observation of natural things and phenomena.75% of the students believe that textbooks are the only way to receive scientific knowledge, and only 25% of the students will independently study science in extracurricular time through other ways, such as experiments, reading, watching popular science videos, etc. And the survey shows that 69% of parents have never taken their children to museums, zoos, aquariums, science and technology museums, planetariums or just one of them. The research shows that the environment, exhibits and the introduction of scientific and technological development of the exhibition hall will stimulate the interest of visitors. Therefore, taking children to museums, science and technology museums and other places can effectively stimulate children's interest and motivation in learning science. Children's interest in science learning is not only reflected in the attention and mastery of the content of science textbooks, but also reflected in the concern and curiosity of scientific facts and phenomena in daily life, as well as the criticism and questioning of scientific conclusions based on evidence. Students' drive to actively explore scientific facts and scientific hypotheses needs to be guided by others. If science education cannot be carried out in combination with students' daily life experience, it will not be able to effectively stimulate students' interest in science learning[6].

2.3 Students' participation in science teaching is not high

According to classroom observation and questionnaire survey, in the low school stage, due to the nature of teaching content and learning situation, teachers will use some teaching methods such as expository method, observation method, demonstration method, natural experience, and the classroom interaction is also good. However, in the middle and high school stage, due to the increase of teaching difficulty and the limitation of class hours. Most teachers use lectures to instill knowledge into students. The classroom atmosphere is dull, students' thinking activity is not high, students rarely communicate with each other or between students and teachers, and students' learning interests cannot be well mobilized. Even in the occasional group experimental class, only some Individual students actively participate in it, while other students just listen to others' experimental design schemes and watch others do experiments, with little interest. Faced with the teacher's questions, most of the students in the lower grades can actively raise their hands to answer, while the number of students in the upper grades who raise their hands to answer is significantly reduced.

2.4 Students' understanding of science learning is not deep enough

Students' understanding of science learning is mainly reflected in the degree of attention they attach

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to science learning, their values of science learning, their self-confidence in science learning, and the sustainability of science learning. The survey found that 68% of the students think that science is not important compared with Chinese, mathematics and foreign languages. Most students spend less time on science than on Chinese, math and English after class. 64% of the students believe that learning science is meaningful to teachers or parents. Only a few students can understand the significance of science learning from the perspective of self-development or national talent training. Correct scientific learning values will help stimulate students' interest in science learning. And the statistical data shows that most students in middle and high school of primary school think that science learning is difficult, and they are not confident in science learning, and they are also afraid of the follow-up science learning in middle school.

3. Analysis on the cause of the problem of pupils' interest in science learning

Through the analysis of the current situation of primary school students' interest in science learning in L school of X County, it is understood that teachers, schools and families all have different degrees of influence on primary school students' interest in science learning. The reasons for the problems in primary school students' interest in science learning are summarized as follows.

3.1 The status of science class is not paid enough attention

Since 2017, the state has clearly stipulated through the "curriculum standards" that science should be taught in the first grade of primary schools, and regards primary school science as an important basic course like primary school Chinese and primary school mathematics. However, the survey shows that the science curriculum is not getting the attention it deserves, mainly in two ways. One is the school curriculum. There is only one science class per week for all the grades in primary school, and the number of science class hours is far from that of Chinese, math, English courses. Even so, science is often occupied by other main courses. The importance that schools attach to science classes will directly affect students' attitudes towards science learning. Second, parents lack a correct understanding of science education. Most parents' education concept is backward, only paying attention to the students' scores in Chinese, mathematics and foreign language, ignoring the correct guidance and supervision of students' science learning. The deviation of parents' understanding of the way of science education affects students' way of learning science to some extent, leading to students' low interest in learning science.

3.2 Science teachers lack professional competence

The quality of science classroom teaching depends on the professional ability of science teachers. Under the influence of exam-oriented education, teachers unilaterally pursue students' academic achievement in science, while ignoring students' all-round development of body and mind. Especially in the middle and high grades of primary school, in order to catch up with the teaching progress, the teachers only use expository method in science class, ignoring the application of other teaching methods. Students are always in a passive state and their subjective initiative is not given full play. The science class which should be full of vitality becomes lifeless and the teaching effect is poor. Moreover, teachers do not flexibly use questioning skills and reinforcement skills in science teaching to increase the interaction with students and improve students' learning interest. In addition, teachers' evaluation of students' science learning is too simple. They pay too much attention to test scores and ignore performance evaluation, and fail to point out the advantages and disadvantages of students in time in the learning process. As a result, the connection between the stimulation of teaching materials and the response of students that teachers hope to get is weak. As a result, students' participation in science learning is not high and their desire to perform is poor, thus reducing their interest in science learning.

3.3 Science curriculum resources are not fully developed and utilized

Science curriculum resources are an important carrier for students to acquire scientific knowledge and exercise their scientific inquiry ability. Using experimental materials to carry out scientific inquiry and product production, and taking students to experience nature outdoors are effective means to stimulate students' interest in science learning and cultivate students' observation and creativity[7]. The investigation shows that L School in X County lacks scientific experiment equipment and teaching AIDS, and is not equipped with a special science laboratory. At the same time, teachers do not

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creatively utilize campus, family, society and natural resources to mobilize students' experience of five senses according to local conditions, which is also a very important reason for students' low participation and interest in science learning.

4. Strategies for improving pupils' interest in science learning

In view of the current situation of pupils' interest in science learning in L School of X County, combined with various influencing factors, the following promotion strategies are proposed.

4.1 Improve the attention of schools, strengthen the status of science disciplines

As the main way for students to receive science enlightenment education, science curriculum should be listed as one of the core curriculum in primary schools. Schools and education management departments at all levels must break the prejudice against science courses in the past, enhance the emphasis on science courses, arrange teachers with science education background to take up science teaching work, increase the number of science class hours, and regularly carry out science teaching and research activities, always care about the real situation and difficulties of teachers and students in science classroom teaching. In order to improve the status of science courses and students' understanding of science courses, we should check the science teachers' lesson preparation, class attendance and homework correction, etc.

4.2 Strengthen communication and cooperation between home and school, and change parents' concept of science education

Children's education is inseparable from the support and cooperation of parents. Therefore, it is important to help parents change their scientific education concepts and establish correct scientific education awareness. First, all government departments can strengthen scientific publicity by holding a variety of science popularization activities, printing and distributing science popularization brochures, and using television and media to enhance parents' own scientific literacy. Second, the school can use WeChat public accounts, parents' meetings and other ways to promote the concept of science education, enhance parents' attention to science courses, and enhance parents' ability of science education. Third, science teachers should also communicate more with parents, inform parents of their children's scientific learning performance and scientific homework in a timely manner, strive for parents' support for relevant scientific activities, and finally realize home-school co-parenting, stimulate students' interest in science learning and promote the improvement of students' core literacy in science subject.

4.3 Enrich teaching ideas and methods, improve the professional level of science teachers

The quality of science classroom teaching is the root of improving students' core literacy in science, and the key to improving the quality of science classroom teaching is to improve the professional level of science teachers in primary schools. As a practical and comprehensive course, science teachers are required not only to have advanced educational concepts and rich scientific knowledge, but also to be able to improve students' scientific thinking ability and lead students to construct interdisciplinary concepts in comprehensive scientific engineering practice activities. Therefore, it is necessary to organize targeted training to guide science teachers to understand the spirit of "curriculum standards", improve education concepts, and enhance the professional level of science teachers. Especially for the middle and high school of primary school, it is necessary to change the previous monotonous infusing teaching methods, adopt situation method, project method, experience method, group discussion method and other diversified, effective and interactive teaching methods to stimulate students' interest in science learning. At the same time, science teachers are encouraged to actively participate in various science related activities and science teaching competitions at all levels to help science teachers' professional development.

4.4 Improve multiple evaluation methods and pay attention to students' scientific academic emotions

Pupils' science academic emotions are dynamic and diverse, so comprehensive evaluation should be carried out in a variety of ways in science learning activities. For example, we can write teaching logs, develop a scale to observe students' performance in class activities, observe the frequency of students' answers to questions, and observe their attention in class. In addition, teachers can also understand

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students' emotion of science study by letting students evaluate themselves, evaluating each other among classmates, talking with students and other ways, so as to help students correct their attitude towards science study, establish good values of science study, establish confidence in science study, and strengthen the sustainability of science study[8].

4.5 Fully develop curriculum resources and expand the channels of science education

Science curriculum in primary schools is a comprehensive curriculum based on practice. Therefore, sufficient curriculum resources are the premise to effectively stimulate students' interest in science learning. Curriculum resources include campus resources and off campus resources. First of all, the school should increase the investment in scientific experimental equipment, learning aids and teaching aids, actively introduce advanced experimental equipment, establish scientific laboratories when necessary, and establish relevant systems and supervision mechanisms to track the quality, quantity and use of experimental equipment. Secondly, fully develop and utilize the curriculum resources in the school. In combination with the campus site conditions, we will open biological parks, breeding farms, weather observation stations, science popularization reading room, etc., and give full play to the important role of wall newspaper, blackboard newspaper, and publicity window in science education. Thirdly, fully develop and utilize family, social and natural resources. Parents are encouraged to give technical guidance to students or guide students to complete some scientific experiments or product production in the form of homework after class. Students can be guided to science and technology museums, botanical gardens, fields, vegetable gardens, reservoirs and other areas to enhance students' exploration ability, increase their opportunities for sharing and communication, and thus enhance their interest in science learning.

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