

A Survey of Primary School Science Classroom Introduction—Take D School in Z County as an Example

Chen Wenjing¹, Liu Le²

¹College of Teacher Education, Xinyang Normal University, Xinyang, Henan, 464000, China

²Central School of Dougou Town, Zhengyang County, Zhumadian, Henan, 463600, China

Abstract: With the smooth progress of the new curriculum reform, classroom teaching should gradually shift from the "teaching" of teachers to the "learning" of students. As the foundation and enlightenment course of science education, primary school science curriculum plays an important role in cultivating students' thinking ability and innovative consciousness. How to carry out efficient science teaching introduction according to the cognitive and psychological characteristics of primary school students is of great significance to students' science learning. Taking D School in Z County as an example, this paper uses classroom observation method and questionnaire method to understand the current situation of science classroom introduction in primary schools, summarizes and analyzes the existing problems, and proposes optimization strategies for science classroom introduction in primary schools.

Keywords: Primary school science; Classroom introduction; Optimization strategy

1. Introduction

The General Secretary pointed out in his report at the 20th National Congress of the Communist Party of China: "Education, science and technology, and talents are the fundamental and strategic support for building a socialist modern country in an all-round way. We must adhere to the principle that science and technology are the primary productive forces, talent is the primary resource, and innovation is the primary driving force. We must thoroughly implement the strategies of rejuvenating the country through science and education, strengthening the country through human resources, and innovation driven development", "We should give priority to education development, make ourselves independent and strong in science and technology, and be guided and driven by talents, and accelerate the development of a strong country in education, science and technology, and human resources."^[1]Therefore, the training of scientific and technological innovation talents has important practical significance. In the stage of basic education, students should not only master knowledge, but also have the initiative to learn and the ability to adapt to society. Primary school is the enlightenment stage for children to understand nature and learn science. Science classroom teaching in primary school should change the passive learning situation of primary school students, cultivate students' ability to be willing to explore, be diligent in using their brains, and be good at doing things, as well as their awareness of finding problems, posing problems, and solving problems. Good classroom introduction can effectively attract students' attention, stimulate their learning motivation, and make students psychologically and intellectually ready for class.^[2]On the basis of combing the concepts of classroom introduction and science classroom introduction in primary schools, this paper analyzes different types of science classroom introduction in primary schools, investigates the current situation of science classroom introduction in D School in Z County, and puts forward optimization strategies of primary school science classroom introduction, so as to provide teaching ideas for front-line science teachers in primary schools.

2. Concept Definition

(1) Classroom introduction

Classroom introduction refers to the teaching behavior that teachers use certain teaching methods to attract students' interest, stimulate students' curiosity and establish knowledge connections at the beginning of class or the beginning of learning a new course or new unit or new paragraph.^[3]

Reasonable classroom introduction can shorten the distance between students and knowledge, help students better understand and master knowledge, which is of great significance to improve teaching efficiency.

(2) Primary school science classroom introduction

Primary school science classroom introduction refers to the teaching behavior of connecting students and scientific knowledge before teachers teach new lessons in primary school science curriculum teaching.

3. Types of Science Classroom Introduction in Primary Schools

According to the basic, comprehensive and practical characteristics of science curriculum content in primary schools, combined with the cognitive development characteristics of primary school students, there are several types of science classroom introduction in primary schools.

(1) Direct introduction

Direct introduction refers to the teacher's behavior of clarifying the learning tasks, ways and methods straight to the point. In direct introduction, teachers usually use relatively general and concise language to express the teaching objectives of the content to be learned and convey the specific requirements of science learning to students.^[4] For example, when learning the chapter "Animals" in the second volume of the first grade, the introduction is as follows: "Students, today we start to learn a new chapter 'animals', this chapter is mainly to let you through the observation of 'snail', 'earthworm', 'ant' and 'goldfish', to form a generalization and understanding of the common characteristics of animals and the basic characteristics of life. We should know how to use evidence to make our own judgments in the process of elevating specific experience to general understanding. Now we will start our first lesson, 'Animals We Know', to explore the small animals around us. "Direct introduction often directly clarifies the purpose, content, method and teaching procedures, with simplicity, which also makes this way of introduction more monotonous, not conducive to stimulate students' interest in learning, so it should not be used too much.

(2) Experience introduction

Experience introduction refers to the way of using students' existing life experience and known scientific materials as a starting point to introduce new lessons.^[5] For example, when learning the lesson "Food for a Day", the introduction is as follows: "We know that 'eating' is what we are interested in. With the improvement of people's living standards, there are more and more kinds of food. Please remember what food you ate yesterday and classify them." The theme involved in this case is the food students eat every day. However, students are not familiar with the types and divisions of food, which is easy to stimulate students' interest in learning. Using experience introduction requires teachers to understand students' life experience and known scientific materials.

(3) Experiment introduction

Experiment introduction is a way to stimulate students' interest in science learning and arouse students' thinking by demonstrating simple scientific experiments at the beginning of a new chapter or a new class, and then lead to the teaching content of the course. For example, when teaching "Can Air Occupy Space?" Teacher can start by asking students: "As we all know, paper gets wet when it encounters water. Suppose you stick the spitball to the bottom of the inside of the cup, and then turn the cup upside down into the water. Will the spitball get wet?" The teacher guides the students to guess and explain the reason, and then stick the spitball to the bottom of the inside of the cup while talking. Then, the teacher slowly inverts the cup vertically into the water, and then take it out vertically from the surface of the water, let the students observe whether the spitball will be wet. The experimental phenomenon may conflict with the ideas in students' minds. In order to guide students to think, the teacher can then asks questions such as "Why isn't the spitball wet?", "What does this phenomenon mean?", leading to the teaching theme of this lesson. When using experiments to introduce new lessons, we should pay attention to the small and precise design of the experiment, and the experimental phenomenon should be obvious. If it is a teacher's demonstration experiment, the teacher's demonstration action should be standardized and smooth, and every student in the classroom can see clearly. At the same time, the explanation and demonstration should be organically combined without dislocation.

(4) Data presentation introduction

Data presentation introduction refers to a way for teachers to guide students to watch objects, specimens, models, pictures or other intuitive teaching AIDS or materials before teaching new lessons, so as to arouse students' interest in scientific learning and elicit teaching content. For example, when teaching the lesson "Time is Passing" in the unit "Measuring Time", the teacher can show students the sundial model and ask students to guess: "What is this?What's the use?" The teacher can then ask the students: "We know that there were no clocks in ancient times, so do you want to know how our ancients used to count time?", which naturally brings students into the content to be learned. When teaching the content of the lesson "The Surface of the Earth", the teacher can first let the students pass on pictures, postcards and other graphic materials collected before the class, and then ask the students: "What terrain do you see?" "Why does the surface of the earth have so many forms, do you want to know the reason?" The teacher inspires students' yearning through a series of questions, so as to naturally enter the teaching of this lesson.

(5) Story introduction

Story introduction is a method of selecting some scientists' deeds in the process of scientific knowledge formation as import materials. Story introduction focuses more on the elements of the history of science. Through the stories of scientists, students' scientific spirit and love of science can be cultivated. For example, when teaching the first lesson "Electricity and Our Life" of the unit "Circuit" in the second volume of the fourth grade of the educational edition, the teacher can tell the story of Franklin's kite flying experiment in a thunderstorm to capture the electricity in the sky to trigger students to think: "After returning home, Franklin carried out various electrical experiments with the lightning he captured from the kite. It proved that the lightning in the sky and the electricity generated by artificial friction have the same properties, both of which are electrostatic phenomena. So what other electrostatic phenomenon in our life? " The teacher then guides students to have a preliminary understanding of electricity through the study of this lesson.^[6] When using the story introduction should pay attention to: First, the stories selected should be short and concise, and should not be too long to appear dilatory; Second, there should be a close connection between the story and the teaching content, not unrelated to the teaching theme; Third, teachers should be able to tell stories. The language of teachers telling stories should be vivid and the expression should be infectious, so as to bring students into the situation of the story and make students sound interested.

(6) Case introduction

Case introduction refers to a way of introducing new lessons by using the scientific facts that students are familiar with or concerned about in life, which actually occur in reality. Unlike story introduction, which focuses on the elements of science history, case introduction pays more attention to realistic characters and events. For example, at the beginning of the teaching of the unit "Tiny World" in the first volume of the sixth grade of the educational edition, we can teach students some specific events that apply the knowledge of microbiology to real life, such as cloning Dolly Sheep, using transgenic technology to treat diabetes, etc., so as to inspire students to think about the role of microorganisms in daily life and then introduce new course. When using the case introduction, we should pay attention to the pertinence of the selected cases. We can choose the typical facts in history, or the recent news related to the teaching theme.

(7) Review introduction

Review introduction refers to the introduction method of introducing new knowledge by reviewing old knowledge. For example, when learning "Conductors and Insulators", chapter six of "Circuit" in the second volume of Grade Four, the teacher can first show a simple circuit board connected by power supply, wire, switch and light bulb, and then ask students "What method can make a small light bulb bright?" The students may answer: "Flip the switch." In fact, the teacher is making use of the circuit knowledge that students have learned to pave the way for their subsequent learning. Then the teacher can further ask, "If the circuit switch is disconnected, is there any way to make the bulb light up when the switch is not on?" After thinking, the students may say, "Find a wire and attach it to both ends of the switch, and the small bulb light up." At this time, the teacher can ask students to experience, and guide students to try to do the same experiment with different objects, so as to judge which objects are conductors, which are insulators. In this way, students can use the circuit knowledge they have learned before to prove whether the object is a conductor or an insulator by observing whether the small light bulb is on or off through hands-on exploration. This way of classroom introduction can make students grasp new and old knowledge more coherently and firmly, help students effectively incorporate new knowledge into the existing cognitive structure, and complete the internalization and self-construction of knowledge.^[7]

(8) Game introduction

Game introduction refers to a way of introducing new lessons by designing game activities and creating teaching situations according to teaching content and students' psychological characteristics. For example, when teaching the lesson of "Feel the Air", students can be guided to carry out a passing game, that is, students are provided with different containers, including bowls, plastic cups and self-sealing plastic bags, so that students can choose appropriate containers, respectively put stones (solid), water (liquid), and air (gas) into these containers, and pass them to each student in the group in turn. In the process of transmission, students will feel the characteristics of three different substances: solid, liquid and gas. After the game, the teacher can follow the trend and ask: "What are the common characteristics of air, water and stone that students can feel during the activity? What are the special characteristics of air? We will lead everyone to feel the air together in this lesson." The teacher then can enter the teaching of the new lesson. When using games to introduce new classes, it is also necessary to pay attention to the design of games that are closely related to the teaching content and cannot deviate from the theme.

4. Investigation on the Current Situation of Science Classroom Introduction in Primary School

From September 2021 to December 2021, this paper investigated the implementation status of science classroom introduction for primary school students of different grades in D school in Z County through classroom observation and questionnaire survey. Classroom observation mainly used the classroom observation record sheet to observe, record and analyze the introduction of science teachers in different periods from the four dimensions of teaching objectives, introduction types, introduction time and introduction process. The questionnaire survey selected 70 students (210 in total) from the low school level, middle school level and high school level respectively as the survey objects to investigate the situation of the introduction of science classroom in this school. The questionnaire mainly consists of three dimensions, which are students' basic information, the implementation of science classroom introduction and students' views on the introduction of primary school science classroom. Through data statistics and result analysis, the current situation of science classroom introduction in this primary school is as follows.

(1) Teachers don't pay enough attention to science classroom introduction in primary school

The fifth question of the questionnaire, "How does your science teacher teach?" The results show that 68% of the students choose the option of "direct teaching". It can be seen that most science teachers do not use classroom introduction in teaching, do not pay enough attention to the classroom introduction link. They think that they only need to talk about the teaching content, but they don't think much about how to elicit and present the teaching content. The survey of students' views on science classroom introduction in primary school shows that 72% of students want to have classroom introduction in science teaching, and only 5% do not want to have classroom introduction, among which, the question "What do you think the role of science classroom introduction in your science learning?" has multiple choices. According to the statistical results of this question, 159 students filled in two or more options, 62% of the students think that classroom introduction can consolidate old knowledge and help them understand new knowledge to a certain extent, 53% of the students think that classroom introduction can activate the classroom atmosphere, and 71% of the students think that classroom introduction can clarify scientific teaching goals. The science curriculum is highly abstract, theoretical, and difficult. If teachers can improve the importance of classroom introduction from the ideological perspective and pave the way for students to learn new content, it will attract students' attention, enhance their scientific learning concentration, make students have motivation for scientific learning, and gradually reach the psychological state that they want to learn.

(2) The quality of primary school science classroom introduction needs to be improved

The length, content, and connection with teaching objectives of science lessons introduction all affect the quality of classroom introduction. Through classroom observation, it is found that in the lesson "Designing and Making Boats" of Grade Two, the teacher guided students to recall the structural features of boats learned in the last class, and then chose appropriate materials to design and make boats. This class adopted the way of review import to introduce new lesson. However, because most students did not review independently after class, the classroom atmosphere of this science lesson was tense and dull. Science teachers should pay attention to choosing appropriate entry points and methods when using old knowledge to introduce new lessons, which may achieve better results. Through classroom observation, it is found that in the lesson "The Dissolution of Salt and Sugar" in Grade Three,

the teacher introduced the theme of this lesson by means of experimental introduction: factors affecting the speed of substance dissolution. In the process of introduction, the teacher presented the experimental materials prepared in advance: 20g white sugar, 2 measuring cylinders, 1 rubber tip dropper, 1 cup of hot water and 1 cup of cold water. The teacher explained while demonstrating, guiding students to observe the dissolution rate of sugar in hot and cold water. The teacher's demonstration was standardized, fluent, and the explanation was clear; The students were focused, interested and active in answering questions. The classroom atmosphere was relaxed and active. However, there were also some problems in the introduction of this lesson: first, the experiment took more than 10 minutes, which exceeded the reasonable introduction time of 2-5 minutes, affecting the progress of the whole lesson. Secondly, the experimental design was not perfect, white sugar and water mixed to dissolve, the experimental phenomenon was not obvious, which was not easy to observe. In the lesson of "Let the Car Move" in Grade Four, the teaching goal of this lesson is that students can know the relationship between the size of the tension and the speed of the car. Through classroom observation, it is found that the teacher introduced the new lesson in the way of game: the teacher first guided the students to think about how to make the stationary car move? Students were provided with materials of toy cars, magnets, ropes, and it was stipulated that starting from the same starting point, in the absence of hands, using a variety of ways to make the car to the end, the team with the shortest time would win. When the students used magnets, ropes and wind to make the car move to the end, the teacher concluded: "The students showed their genius and used various forces to help the car to reach the end. Next, we will begin to learn the content of this lesson." It is found that the game content has little relationship with the teaching objectives and deviates from the theme. In addition, the game introduction time of this lesson is more than 10 minutes, which is too tardy.

According to the statistical result of "What do you think science teachers should do to improve the classroom introduction? (multiple choices)" in question 10 of the student questionnaire, 81% of the students believe that the form of classroom introduction needs to be enriched; 54% of the students hope that science teachers should appropriately increase the interest of classroom introduction; 68% of the students hope that the science teacher can combine life experience in the introduction to narrow the distance between scientific knowledge and daily life; 59% of the students think that the length of science introduction needs to be reasonably arranged; 38% of the students think that the introduction should focus on the theme and reduce the content irrelevant to the class. It can be seen that the content of science classroom introduction in primary school needs to be improved, and the quality of classroom introduction needs to be improved.

(3)The form of science classroom introduction in primary school is relatively simple

The statistical result of question 6 of the questionnaire, "What kinds of introduction do your science teacher often use?" showed that 146 students have only selected one option, 46 students have selected two options, and only 18 students have selected three or more options. 69% of the students chose science teachers to teach new lessons directly, 36% of the students chose science teachers to use life experience to introduce new lessons, 27% of the students chose teachers to introduce new lessons by reviewing old knowledge, and only 5% of the students chose science teachers to introduce new lessons by telling stories, doing experiments, playing games, physical displays, etc. Through comparison, it is found that students in the same class almost all choose the same option for this question. Therefore, it can be seen that most science teachers in primary school use a single method of introduction in science teaching. Teachers use the same way of introduction regardless of teaching content and individual differences of students, which is unfavorable to effectively stimulate students' interest in science learning and efficiently carry out science teaching.

5. Optimization Strategies for Primary School Science Classroom Introduction

(1)Improve ideological understanding and renew educational concepts

As the main channel for children to receive scientific enlightenment, primary school science curriculum plays an important role in the formation of children's scientific thinking and the cultivation of innovative consciousness. The theoretical and abstract nature of science course makes teachers must take certain means and methods to effectively guide students into the learning process of new knowledge.^[8]However, it is precisely because teachers are bound by the traditional exam-oriented education and experiential teaching, there will be no introduction in science classroom or the purpose of introduction is relatively simple and the design is very casual. Therefore, teachers should strengthen their own learning of education and teaching theories, update their education and teaching concepts in

time, and improve their understanding of the introduction of scientific teaching. When preparing lessons and designing study plans collectively for science classes in grade groups, science teachers should also be organized to discuss the design and implementation of lead-in, and constantly improve them on the basis of reflection.

(2) Improve the purpose, relevance and ingenuity of classroom introduction

In the design of science class introduction, pertinence and purposefulness are the primary conditions for classroom introduction.^[9] Teachers need to first think about how to guide students to the learning content and help students clarify their learning objectives, so that teachers can choose the introduction of resources and methods targeted, rather than focusing on how to find new and interesting resources. The introduction should be relevant in order to link the old and new knowledge and help students learn new knowledge better. Therefore, when designing the introduction, teachers must conduct sufficient teaching content analysis and learner analysis. Understanding the arrangement system, logical sequence of knowledge in textbooks and students' reality are the basis for achieving the purpose and relevance of the introduction. Understanding the arrangement system of teaching content can find the points of relevance, and understanding students' learning situation can find the methods of relevance. In addition, the ingenuity of introduction is mainly reflected in the length of introduction, intuition, inspiration and interest. For a 45-minute class, the time of introduction should be controlled within 2-5 minutes. If the time of introduction is too short, the situation cannot be laid. If the time of introduction is too long, the progress of the whole class will be affected and it will be procrastinate. In fact, the ingenuity of the introduction is actually the embodiment of the introduction of art. For example, for the lesson "Let the Car Move" in classroom observation, the teacher can change the rules of the game, let students pull the car in the competition, and the student who reaches the end point the fastest wins. After improvement, the content of the game introduction is consistent with the teaching goal of this lesson "knowing the relationship between the size of the pull and the speed of the movement", which can help students enter the teaching process of this lesson more smoothly.

(3) Enrich the form of classroom introduction and improve the teaching effect

As a comprehensive curriculum, the science curriculum in primary schools covers a wide range of contents, involving four major fields of material science, life science, earth and universe, technology and engineering. Teachers should adopt appropriate and diverse ways of introduction according to the characteristics of knowledge content in different fields and students' learning conditions. For example, when learning the content of scientific inquiry field, we can use more experimental introduction; The content of material science and life science is close to the actual life of students, when learning this part of content, experience introduction can be used appropriately, combined with physical display; Due to the limitation of objective conditions, the content of the Earth and the universe is far away from students' daily life, so it can be introduced through models, pictures, films, videos and other materials to enrich students' perception. Various ways of introduction can not only stimulate students' interest in scientific learning, but also enhance students' sense of experience in scientific learning and improve teaching efficiency.^[10] For example, when learning the lesson "Different Materials" of the first grade, teachers can prepare paper cups, plastic cups, glass cups, and stainless steel thermos cups in advance. Through physical display, students can observe that these cups are made of different materials. At the same time, multimedia videos can also be played for students to observe the reactions of these cups with different materials when they are impacted, thus leading to the teaching goal of this class, that is, students can actively explore the characteristics of different materials. This way of introduction can help students enter science teaching in a relaxed and happy atmosphere, and the purpose is clear, so that teaching can achieve twice the result with half the effort.

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