ISSN 2522-6398 Vol. 5, Issue 4: 105-108, DOI: 10.25236/FER.2022.050420

The Psychological Development Laws of Elementary School Students in the Teaching Methods of Science Class

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Abstract: *The Central Committee of the China Communist Party and the State Council have pointed out that students should be guided to adapt to the requirements of the new social environment as soon as possible in terms of concepts, knowledge, ability and psychological quality. It shows that paying attention to the psychological development of children at different stages and grasping the regulations of children's learning and psychological development have received high attention from schools and society. As a comprehensive practical course, science class aims to cultivate students' thinking skills, hands-on skills, creative abilities, and carried out science curriculum activities in a more targeted manner by grasping the regulations of students' psychological development in order to efficiently promote the high development of students' scientific literacy. This paper outlines the regulations of children's psychological development and the applications of related principles, analyzes the scientific nature of the teaching practice of science class curriculum by summarizing the common teaching methods currently used in science class. It is hoped that it will provide a partial reference for related research.*

Keywords: *Science class, Teaching methods, Psychological development, Laws*

1. Introduction

The Opinions on Further Strengthening and Improving Moral Education in Schools issued by the Central Committee of the Communist Party of China and the State Council have clearly stated that "with the rapid development of science technology and the gradual establishment of the socialist market economy system, students should be guided to adapt to the new requirements as soon as possible in terms of concepts, knowledge, abilities and psychological qualities", following the laws of children's psychological development at different stages, and on this basis, children are guided to learn efficiently and improve their literacy which have received widespread attention. science class aims to cultivate students' thinking skills, hands-on skills, creative abilities which are not achieved overnight, we should grasp the laws of psychological development, such as the student's level of cognitive development and intentional development at different ages to carry out targeted and reasonable science teaching activities, in order to efficiently promote the high level of students' scientific literacy development. In addition to the different levels of overall psychological development of elementary school students at different times, individual psychological development such as learning ability may also vary, mainly in the learning effect of science courses. In this paper, we summarize the three teaching methods commonly used in science class, outline the laws of children's psychological development and the application of related principles, and analyze the scientific nature of the science class teaching practices. It is hoped that it will provide some reference for the research related to the integration and coherence of the children's psychological development regulations in the process of science teaching.

2. The application of the laws and principles of psychological development of elementary school students in lecture method

2.1. The use of the lecture method in science teaching

The lecture method is a method in which the teacher narrates, describes, explains, and draws inferences through simple and vivid language to convey information, impart knowledge, clarify concepts, argue laws and formulas, guide students to understand or analyze problems, and develop their intelligence. For example, in lower grade science classes, the teacher will tell scientific concepts and truths through

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interesting and correct scientific short stories with intonation , making the class richer and simpler; in upper grade science classes, the teachers' teaching style will be more mature which can be also reflected in the storytelling approach, it will usually changed to a verbal introduction of questions to guide and explain the scientific knowledge to the students and answer questions asked by students later.

2.2. Analysis of the psychological development laws and principles embodiment

The main characteristics of elementary school students' psychological development are rapidity, coordination, openness, and plasticity, which indicate that children in elementary school are receptive and easily learn from others' perspectives. The lecture method allows students to have a direct and rapid learning experience, allowing them to gain a large amount of systematic science knowledge in a short time. Secondly, according to Freud's theory of psychosexual development stages, elementary school students are generally in the fourth stage who can be easier to have high interests in exploring the natural environment and learning academic knowledge, while the cognitive development level is higher in the upper grades than in the lower grades, this is the psychology basis for the teachers' verbal guidance and the different ways of teaching to further ignite students' enthusiasm for science and culture.

However, the didactic method will still be counterproductive. The attentional characteristics of elementary school students is an important element of cognitive-psychological development, as they have a very unstable attention and a very limited attention span. In science class, the systematic knowledge taught by the teacher usually requires students' intentional attention, which can be distracted or relaxed over time, or the limitation of the attention span makes students listen to the subject in a foggy manner, all of factors may stop achieving the predetermined teaching objectives of the curriculum and does not allow students to truly learn knowledge from the science class.

3. The application of the laws and principles of psychological development of elementary school students in discussion method

3.1. The use of the discussion method in science teaching

Discussion is organized and guided by the teacher which centered on the students, so each student is free to express his or her opinions within a certain range, and gradually adjust their views through the acquisition of feedback to gain a comprehensive understanding of the problem finally. For example, in the lesson "The Formation of Rocks", the teacher firstly clarifies the discussion of the different rocks’colors, the corresponding rock types, and rock characteristics, then organizes students to discuss in groups, and students firstly independently observe the color, shape, and texture of rocks in their hands and then summarize the characteristics of the same or different types of rocks by group discussion. Students actively participate in this process by discussing, adding with each other and expressing their own opinions, the teacher should pay more attention to the process of students discussion than the results of thinking.

3.2. Analysis of the psychological development laws and principles embodiment

According to Piaget's cognitive development stage theory, elementary school students aged 7-12 are in the concrete operation stage, they have multidimensional thinking and categorization thinking which can summarize and categorize things correctly, and at the same time, they have de-ego-centered thinking which can put themselves in other people's position and revise their views, which makes them better at listening and accepting other people's opinions in the discussion process. It also enables students to listen to and accept the opinions of others and to realize their own shortcomings in the discussion process, so that they can make improvements and changes, rather than insisting on or arguing for the absolute correctness of their own opinions. As independent individuals, students have distinctive and different psychological characteristics of personality, and the psychological plasticity of primary school students is strong. In the teamwork discussion process, students with different temperaments and personalities can influence and make up for each other, for example, mucous students are good at thinking during the group discussion so they can add and correct the views of bilious students in time, The depressed students will become slightly more confident and bold under the influence of the former, thus mobilizing students' enthusiasm and creativity while giving full play to their personality qualities.

However, elementary school students still reveal a certain amount of self-centeredness, and their personalities are still in an unstable stage of psychological plasticity, although they are extremely

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malleable. The questions discussed in science classes usually have standard answers, it may lead students to prefer their own answers to others which is unable to avoid the circumstances of arguments or refusing participating in discussions because of emotions. This has inspired science teachers to respect students' individual psychology while guiding their overall development when organizing discussions to lay the foundation for more mature psychosocial development in the future.

4. The application of the laws and principles of psychological development of elementary school students in experimental inquiry method

4.1. The use of experimental inquiry method in science teaching

Under the teacher's organization, students are guided to ask questions, make conjectures, develop experimental plans, and through the students' relatively independent inquiry and research activities, observe experimental phenomena and record experimental data, finally get the experimental conclusions, and this process is called experimental inquiry method. For example, the experimental inquiry method is used in the elementary school science lesson "Lightwardness of Plants", where plant entities are used as objects of study to conclude that plants grow toward light by asking questions, making hypotheses, formulating plans and observing phenomena. In the process of experimental investigation, students not only feel the fun of experimentation and observe the results with their own eyes, but also give full play to the characteristics of thinking to design experiments and summarize the results.

4.2. Analysis of the psychological development laws and principles embodiment

In the plant to light experiment, students firstly find the leaf growth bending, and then integrate the observations of light replenishment, leaf deviation direction and other experimental factors and phenomenas, feeling up to the overall perception, understand the leaf as a plant whose growth has phototropism. Elementary school period is often called the former adolescent development period, children in the lower grades of elementary school still retain the psychological characteristics of preschool children, while the upper grades of elementary school children with the growth of physical age, gradually come into the adolescent development period, comprehensive characteristics of them are manifested as playful, active, lively, enthusiastic, have a strong curiosity and imitation ability. Feeling, cognizing, and observing a series of "visual impact" and hands-on experiments practice can make students free from the constraints of boring theory achieving the subjective learning of students. The interesting scientific experiments unraveling one mystery after another not only to meet the psychology of elementary school students to play but also to meet their curiosity.

At the same time, this is also the process of concrete thinking, students in the process of hands-on experiments more easily concrete thinking up to abstract thinking, so that the understanding of scientific knowledge becomes easier. Secondly, Caughley's epiphany theory states that individuals form "epiphanies" through trial and error, which is also a kind of thinking, the focus of that is no longer just on the tools, but on the relationship between the goal to be achieved and the tools to choose the suitable tools. Students may experience several failures in the process of investigating experiments, which prompt them to re-examine the choice of experimental methods and materials from the expected results of the experiments, and to form "epiphanies" through continuous reflection and revision.

Through the above analysis and reflection on the integration of teaching methods and students' psychological development, we can learn that as science teachers, we should grasp the characteristics of elementary school students' psychological development, pay attention to the continuous changes of students' psychology, and create an enjoyable but rewarding science classes for students through a variety of rich teaching methods based on the laws of students' physiological and cognitive development, so that elementary school students can really learn science, love science, and develop a quality of lifelong learning science.

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