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Problem-driven, Supporting In-depth Inquiry in Early Childhood Project Activities – Take the Taipan Nature Exploration "Sliding Down the Hillside" as an Example

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Abstract: ***Problem-driven in-depth exploration of young children is to take children as the main body and problems as the starting point for learning, so that children can need solutions around problems, so as to improve the initiative and participation of learning, stimulate children's curiosity, and enhance children's high-level cognition. This paper takes the kindergarten nature exploration "Sliding Down the Hillside" as an example to use the three-order problem drive to analyze the source of the problem and the teacher's support strategy to support the in-depth exploration of young children.***

Keywords: Problem-driven; Source of the problem; Inquiry; Support policies.

1. Introduction

Questions can enable children to actively explore, so that they can use their existing experience more actively, extensively and deeply, analyze the current problem situation and propose solutions to the problem, and interact with people, things and things in the process of finding problems, raising problems, analyzing problems and solving problems. Teachers give reasonable guidance to promote children to learn to think, self-induction and thinking improvement. The following is a big class project activity "sliding down the hillside" as an example, to talk about the problem to drive children to take the initiative and in-depth investigation.

2. Promotion: Three-level Questions Drive Children to Explore Deeply

Origin: A nap after exercise, children sitting on the hillside or looking up at the sky or directly lie down, a child said: "It is too slippery here." This discovery allowed several children around to run and experience the "slippery" hillside, "can the hillside really be slippery?" What happens when a hillside meets a group of inquisitive children?

2.1 Exciting "Exploration" with "Fun" - Is the Slope Really Slippery?

How do you prove that a hill is slippery? Children looking for materials experiment: Magnolia seed pods, stones, branches, fallen pomegranates... The leaves and branches were pushed forward without moving, the pods and stones rolled to a halt, and the pomegranates rolled down the hill as fast as they could. Through the collection of materials for comparative experiments, the children found that the phenomenon of spheroids can roll down the hill, while people roll into a sphere is dangerous and can only slide with the slope of the hill.

Children are born with a "sense of curiosity," and when children are interested in an event, they are sensitive to an event around them. They leaned down to touch the hillside, walking down the hillside, running, "the soil here is very loose, it is very slippery." "Grass, prickly ground, can't slide down." "I have seen rainbow-colored hillsides in Flower Valley, where adults can slide down on tires." "We need something slippery to help us." ... Xiaoming put several bamboo poles together on the hillside, the small buttocks can slide smoothly from the top, but the bamboo poles immediately dispersed. This "successful experience" gave the child great encouragement.

Reflection: Teachers conform to children's interests, start from the big picture, create an open situation, children operate independently, children continue to reorganize their own experience and gain new experience. In the experiment, children have found that the slope has a natural slope, and they also know that the object on the slope will follow the phenomenon of sliding and rolling. The slope of the kindergarten is a relatively gentle soil slope, which provides a natural slope for the object to roll down the hill, but in some places the object slides fast and in other places the object slides slowly. So "Can I go down the hill?" "Where is the best way for me to slide?" New problems arise, and teachers encourage children to think, observe, experiment, adjust, and further glide to explore.

2.2 "Doubt" Leads to "Investigation" - What is the Best Taxi Route

2.2.1 Observation of the downhill slide: How do we slide down the hill?

In order to support themselves to slide down the hillside, children look for sliding aid materials: cartons, cardboard, cloth bags, wooden balance boards... I took the baby and tried it all. They found that not all materials could be used for sliding: you couldn't slide off a cardboard box; Sitting on a cloth bag, cardboard, and balance board, it is very slow. Children analyze sliding AIDS and determine that the balance board is the best aid. Children also found that the feeling of sliding in different places is not the same, there are places to slide slower, and change a more oblique place to slide faster.

2.2.2 Know the slope of the hill: What is the best route for sliding

When children have the experience of sliding, they find that the feeling of sliding in different positions on the hill is not the same. Where is the fastest? The child begins to observe the terrain on the hillside, what method can be used to find the fastest place to slide? Operation 1 Find a spot to plant the flag. Combined with the sliding experience on the hillside in the early stage, the children found the fastest starting point of their so-called sliding through the existing experience and visual observation, and used the digital flag as the starting sign, and the rolling direction was preset at the starting position, the approximate trajectory of the sliding was estimated, and the digital flag was inserted at the possible sliding end. Operation 2 Taxi check. In order to test the feasibility of sliding, the children found a basketball as a test material. In practice, the child discovers that the ball does not follow the preset trajectory, and that the path of the object will be deviated by hitting the object or by changes in the

terrain, such as small holes in the hillside, scattered seed pods, and small slopes on the side. In the experiment, some children tried to roll the ball from a low point to a high point, and when the ball rolled forward for a distance, it also turned. Combined with the experiment, children have a further understanding of the terrain characteristics of the hillside. Different slope types support different sliding conditions of objects. Combined with the recognition of slope types and children's experience in sliding test, children believe that sliding on a straight landslide is the fastest and most interesting.

Reflection: Practice has proved that children have the potential of independent inquiry. By collecting materials, drawing, operation, discussion and expression, they collect information related to supporting sliding, record and store the observed hillside information, and organize next activities based on these useful information, and gradually increase the relevant experience of hillside slope in the cyclic activities. By using observation, thinking, discussion, experiment and decision, we can obtain methods to analyze phenomena and solve problems. We can perceive the influence of slope slope on sliding, know that the more inclined the slope, the faster the sliding, and also understand that the complex convex slope formed by the potholes on the slope will affect the direction and speed of sliding.

2.3 "Walking" Leads to "Thinking" - How to Make a Slide on a Hillside

After the children experienced the fun of sliding on the hillside with the balance board, the simple sliding on the hillside could not meet the needs of the children, they expected to slide faster and more stimulating, and also proposed the idea of transforming the hillside: transforming the slope of the hillside, shaped into a slope that can be quickly slid down the hillside.

Have a wooden ladder, balance board combination game experience, the child moved, put, assembly, adjustment, soon appeared on the hillside a high slide. As more and more people experience it, the "tourists" keep reporting new problems to this sliding board: we can only quickly slide through four balance boards, and the back is not fast. Slide over where the balance board is connected, and the high and low balance board will hurt your butt.

Children who learn to observe begin to see the cause of the problem: the Angle of each board is not the same. In the construction area, children drew plans to implement adjustments and tried various support methods for building blocks. On the hillside, the child consciously uses ladders and tires to provide height for the balance board to form a slope. In the slope modification activity, the children actively explored the slope and support of the large toys, adjusted the slope of the slope using the existing materials in the park, and successfully built a straight slope on the hillside. When the balance board on the slope was found to be warped, the children repeatedly pressed the balance board to analyze the problem of warping; Discuss decisions about how to stop the top board from turning up; The feasible reconstruction scheme is analyzed systematically. In practice, we try to adjust the material and extract the support methods in two different gradients. At the end of the transformation, the children also creatively provided "stairs" over the landslide.

Reflection: Children's exploration process is full of fun to experience, and it is also a process of success and failure. In this process, children participate in person, have multiple perceptions, active expression and practical operation, and go through multiple rounds of discovering problems, analyzing reasons, trying to solve and rediscovering problems. They have experienced hierarchical development from low-order recognition to higher-order cognition. This kind of success experience of children is different. This research is not limited to letting children solve problems, but to broaden their horizons, expand and extend, and inspire children to ask questions while solving problems, so as to facilitate further research and cultivate their practical ability and innovative consciousness.

3. Thinking: What Kind of Problems are Easy to Trigger Children's In-depth Exploration

Questions are the soul of inquiry and the driving force of thinking. Based on this case, we think and analyze: Where does the problem come from, what kind of problem is easy to trigger children's inquiry?

3.1 Issues of Concern to Young Children

Although the essence of inquiry is to use the brain and solve problems, not all problems can stimulate children's enthusiasm for inquiry, and only when solving the problems that children are really interested in and concerned about can children's thinking be really active. In the case of "Is the hill really slippery?" The generation of problems is also the generation of learning opportunities. When children are curious or confused about things in life, teachers are good at finding, supporting children, accurately capturing the problems that can trigger children's positive thinking, and when children ask "Can the hillside really be slippery?" When this question was asked, the teacher noticed that the child was interested in the hillside. At this time, teachers stand in the position of children, find children's internal needs, find children's concerns, and follow the trend to support children to explore.

3.2 Moderately Challenging Problems

Young children's learning is closely related to known experience. Ausubel believes that all meaningful learning is generated on the basis of the original cognitive structure. Therefore, in inquiry learning, teachers should first speculate on whether the problems generated by children are based on children's existing experience, and whether they are questions that children can "jump and reach". If the problems do not need to be explored, children will not have enthusiasm and cannot continue to actively participate in the problems that children can get answers from their existing experience. If the problem to be solved is too far away from the existing level of children, such problems are difficult to make children have the motivation to learn. In the case "How do you change the slope of a hill?" This problem comes from children's desire to "build a slide" and the understanding that "straight slope and large slope are easy to slide". The problem is higher than their current cognitive level, but there is a need to drive the challenge suitable for young children. Appropriately challenged questions enable children's exploratory behavior to focus on clear tasks and keep thinking during the process. Questions can play a role in connecting children's exploratory behavior, thus increasing the benefits of children's exploratory actions.

3.3 Problems in Combination with Real Scenarios

The specific questions contained in real life situations make the inquiry situational, more intuitive and targeted, and can stimulate children's desire to participate and learn. Children's thinking is direct, and when problems are presented in a way that helps children understand based on what they already know, children's performance and comprehension tend to improve more. In this case, children are exposed to real problem scenarios such as "I can slide down the hillside", and each stage focuses on one problem for exploration. In "learning to play, learning to play", children explore the hillside, perceive the slope of the hillside, and experience the fun of interacting with the environment. In the deep dialogue with the slope, we can realize the deep understanding, deep analysis, deep expansion and deep application of the slope. I learned to recognize and analyze the different landforms of the natural slopes, and felt the natural beauty of the slopes with various gestures.

3.4 Problems that Can be Resolved by Operations

In the Guide to Learning and Development for Children aged 3-6, it is proposed that the learning method of children is to gain experience through "direct perception, practical operation and personal experience". If the inquiry questions are not specific enough and cannot be solved by children through hands-on operation, such questions will be difficult to trigger children's inquiry. In the case, "Is the hill really slippery?" The problems of "what is the best sliding route" and "how to change the slope of the hill" are solved through children's operation, experiments and research and gain new experience. In the operation, children learn to think, multi-dimensional comparison, analysis, reflection, and actively solve problems and find problems.

4. Strategies: How can Children Experience Meaningful Inquiry

4.1 Use Thinking Tools Skillfully to Solve Problems in Depth

Marzano's learning dimension framework divides cognitive strategies into low-order cognition and higher-order cognition, and higher-order cognition includes six kinds: problem solving, creativity, decision making, experiment, investigation, and system analysis. Cognitive strategies can be used to judge the quality of children's inquiry. Although low-order cognition and high-order cognition need to match each other, the cognitive depth of the whole inquiry can only be determined by judging which of the questions belong to the higher-order cognition. This case emphasizes the children's experience and inquiry in the problem, and the conscious application of problem solving, experimentation, decision-making, research, creativity, and even systematic analysis. In the higher-order cognitive strategies, teachers and children jointly construct psychological mechanisms to complete problem exploration. For example, in the slope experiment, the sliding experiment with auxiliary materials, the best route experiment and other experiments, what did the teacher observe from the children? How can I explain it? What can I predict based on my interpretation? How do I test my predictions? What happened in the experiment? Is it something I predicted? Should I interpret it differently? This way of thinking expands and refines knowledge and forms deep understanding.

4.2 Design a Series of Contents of Scientific Learning, and There are Gradients in the Structure of Questions

The project "Sliding down a hill" is based on a real problem and is integrated in itself. In the process of inquiry, children will decompose an integrated large project into a small project (that is, phased problems), each small project is to promote the solution of the entire problem, the completion of the last problem is the basis for the next task, and the experience gained from the solution of the last problem is the basis for the solution of the next problem. From "Is it really possible to slide on a hill?" Let children perceive the slope of the mountain slope; "What is the best taxi route?" The influence of different slope on the sliding line is obtained, and the straight slope from high to low is the best route. "How to make a slide on a hillside" is a knowledge connection and transfer that children construct on the basis of experience gained in solving the first two problems to transform the slope of the hillside. From the perception of slope - the cognition of different types of slope - the impact of slope on sliding - the transformation of slope, these are in accordance with the path of problem solving, one link one link, step by step, and form a logical progressive relationship.

4.3 Provide "Support" for Inquiry, So that the Inquiry will be More Sustained

How to keep children in the learning state of inquiry in project activities is the most critical issue.

Therefore, teachers need to provide "scaffolding" for children to support and encourage them to continue to explore. For example, in the process of making slides for children, "the connection between the board and the board is not smooth, and it will tilt up when sliding" has become the biggest confusion. This is because children have the experience of sliding on the slide, and they can obviously perceive the sliding speed, but they pay little attention to the structure and composition of the slide. The teacher on the homeopathic support: large toys also have a slide, its support is what? Guide children to sort out the experience of operation support through questions, and apply it to the action of transforming hillside slope.

In short, problems are the seeds that generate new ideas, new methods and new cognition. Teachers keenly grasp the problems that children are interested in and are suitable for children's exploration, give them time and space for independent exploration, support them to use resources for continuous exploration, and constantly use cognitive strategies such as problem solving, creativity, decision-making and experimentation. Dare to explore and constantly construct new experiences.

References

[1] Ministry of Education. Guide to Learning and Development for Children aged 3-6. 2012,9.
[2] Peng Junying. Supporting Children's exploration in subject activities [G]. Early Childhood Education, 21,6.
[3] Xia Xuemei. Project-based learning design: International and local practices from the perspective of Learning Literacy (2nd Ed.) [M]. Beijing: Educational Science Press, 2021.