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The significance and strategies of revealing preschool children's "preconception" in the field of science

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ABSTRACT
The effective implementation of preschool education activities cannot do without the "preconceptions" of young children. It is significant for teachers to reveal these preconceptions in a correct and reasonable manner before conducting scientific activities. Revealing preschool children's preconceptions requires creating a material and psychological environment conducive to autonomous discussion, engaging in dialogue and communication with children, listening to them, and guiding their cognitive expression through artistic creation. These elements form atmosphere strategies, path strategies, and expression strategies. Through the exploration and revelation of preconceptions, substantial evidence can be provided for the design and implementation of teaching activities.

KEYWORDS
preschool children; preconcept; strategy

1 Introduction

In recent years, the prevailing view in preschool education has been "teacher-led, child-centered." The design and implementation of educational activities in the field of science for preschool children have also gradually become more consciously designed to ensure that children are the main subjects of their activities. The key lies not only in the clarity and reinforcement of the concept of "child-centeredness" in teachers 'minds but also in their understanding and recognition of preschool children, grasping their current state of scientific knowledge, especially the "preconceptions" formed through independent exploration. Only then can the "child-centered" position be highlighted in the spiral process of "design—implementation—reflection—reconstruction" in science activities, thereby continuously enhancing teachers' abilities to design and implement scientific activities.

Mastering the preconception of preschool children before the activity and designing scientific activities in line with the actual situation of preschool children are the necessary conditions to ensure that preschool children are in a dominant position and an important guarantee for preschool children to realize the transformation of scientific concepts.

2 Reveal the significance of preschool children's preconception

Scholars in our country define "accumulating a certain amount of prior knowledge" as preconceptions. Foreign scholars also hold similar views: "Students do not enter the classroom with an empty mind but bring their previous concepts and experiences into the classroom for learning. These concepts and experiences influence how they acquire information from new experiences in various ways."[1] The so-called preconceptions, particularly those in the scientific domain, refer to existing cognitions relative to new knowledge that exist in people's minds. They may be correct, vague, or incorrect, serving as the premise and foundation for acquiring new knowledge or shifting towards more accurate cognition.[2]

In the field of preschool science education, in order to truly reflect the "child subject" status in activities, and in order to realize the development of children's scientific cognition and the transformation of scientific concepts, it is of great significance for teachers to reveal the pre-concept of preschool children in a correct and reasonable way before the development of science activities.

2.1 It is helpful to the reasonable design of teaching activities

By revealing the preconceptions of preschool children, teachers can effectively identify the scientific concepts that need to be corrected or enriched in these young learners. This process helps uncover the gap between their preconceptions and accurate concepts, even conflicts, providing a basis for designing science education activities. At the same time, designing science activities based on the current level of preschool children allows for an accurate determination of their "zone of proximal development." This enables teachers to set reasonable teaching objectives, thereby designing science education processes that are grounded in children's reality, focused on their development, and aligned with their levels. Only then can the philosophy of "student-centeredness" and "childhood as the subject" be

better embodied, ensuring that the designed science activities meet the needs and aspirations of children's growth.

2.2 To promote the conceptual transformation of preschool children in a targeted way

By revealing children's preconceptions, teachers can identify the unreasonable, incomplete, or inaccurate aspects in preschool children's preconceptions. This naturally exposes the difficulties preschool children face in concept transformation and the key points that teachers should pay attention to in designing and implementing teaching activities. At these critical and challenging points, more appropriate methods should be adopted to help preschool children overcome difficulties encountered during concept transformation, promoting effective conceptual changes in their minds and enhancing their understanding and application of new concepts.

2.3 Effectively improve the effectiveness of teaching activities

Revealing preschool children's preconceptions can actually enhance the effectiveness of scientific activities, avoiding the awkward and inefficient situation where "teachers teach but children learn nothing." Some early childhood educators often overlook preschool children's preconceptions when designing science activities, designing teaching activities based on adult ideas and assumptions, ignoring the existing knowledge and cognitive levels of preschool children, treating them as blank slates with no prior knowledge. As a result, preschool children often show little interest in the activities organized by teachers or become so familiar with the content prepared that they do not participate attentively, leading to low efficiency or even failure in teaching activities. This not only wastes time but also means that children do not acquire any new knowledge. For teachers, this frustration stems from outdated educational philosophies; reluctance to do thorough preparatory work, opting instead for ready-made designs; and a lack of child-centeredness, unwilling to analyze children's needs, making it impossible to design excellent lessons without understanding their learning situations.

Therefore, only by fully understanding the preconception of preschool children can we carry out teaching activities that are not only interesting to preschool children but also meet their growth needs, promote the further development of preschool children's existing concept level, and realize the educational value of teaching activities.

3 Reveal the strategies and methods of preschool children's preconception

3.1 Promote children's independent discussion

In kindergartens, it is common to see children gathered in small groups, focusing intently on an object or engaging in lively discussions. The topics they discuss are often those that interest them or that they wish to understand and explore. Through these discussions, children's perspectives and analyses of the issues frequently reveal their preconceptions. Children's autonomous discussions provide teachers with clues and opportunities to understand their current cognitive levels and uncover their preconceptions.

Autonomous discussion can reveal young children's genuine views and simple perceptions of something. Teachers can use these discussions to uncover the children's existing knowledge, experiences, and preconceptions, designing scientific teaching activities that are reasonable, targeted, and effective in promoting conceptual transformation. Moreover, during autonomous discussions, the processes of expression, communication, questioning, and debate among children often lead to cognitive conflicts. For children, cognitive conflict is the fundamental driving force for conceptual transformation. Therefore, when teachers encounter cognitive conflicts generated by children, they should avoid taking a judge-like position and strive to deepen the children's discussions, thereby exposing deeper preconceptions.

To promote communication and discussion among young children, the environment is a highly influential factor. Teachers should provide both a good physical and psychological environment for the children. In terms of the physical environment, teachers can regularly update the classroom wall decorations and area materials, offering interesting and novel scientific materials to spark children's curiosity and desire to explore, thereby encouraging their discussions. Regarding the psychological environment, teachers should recognize that children will only have the freedom to express themselves actively when they feel respected and psychologically safe. Therefore, teachers should create a positive, democratic, and secure psychological atmosphere, making it easy for children to speak up, especially during playtime and transitions between activities. Only then will children feel entitled to freely express their thoughts, and with recognition, encouragement from teachers, and respect and listening from peers, they will naturally maintain a pleasant state of mind and positive emotions, engaging in discussions with enthusiasm.

3.2 Actively talk with children

Actively engaging in conversations with young children is the most effective method for early childhood educators to

uncover preconceptions, featuring convenience, time-saving, and ease of operation. Conversations not only require teachers to understand the children through talk but also emphasize the art of conversation, aiming to reveal hidden preconceptions deep within the children's minds through skillfully designed questions. When actively conversing with young children, attention should be paid to the following two aspects:

3.2.1 Understand the interests of young children and determine the content of conversations

In actual teaching processes, whether the activity design meets the interests of children is a key factor affecting the smooth progress of activities. It should be clear that children do not "pretend" to be interested in things they are not, nor will they pretend to be interested in what the teacher says to maintain an adult-like appearance. For children, they will directly show their interest in the teaching activities. Children who are interested in something will be very proactive and cooperative, while those who are not interested will exhibit obvious signs of inattention or even impatience. The preconceptions about children that teachers need to reveal should also be based on things or activities that interest them. Driven by interest, children can actively engage in scientific exploration, overcome difficulties on their own, complete investigative activities, and experience the joy of scientific inquiry. Therefore, when teachers use conversation to reveal children's preconceptions, they should first find the points of interest for the children and then determine the content of the conversation.

Generally speaking, teachers need to grasp children's interest points by observing their behaviors and listening to their languages, and then reveal children's preconceptions through smooth conversations.

Observe the behavior of young children. Children are innocent and simple; their attitudes toward things often directly manifest through facial expressions, body movements, and mental states. Therefore, observing children's behavior is an effective method to discover their points of interest. The behaviors that indicate a child's interest in something mainly include: focusing on manipulating an object; carefully observing a phenomenon; repeatedly asking the same question or approaching a certain object; showing excitement whenever they see something; actively discussing a particular thing or event with peers. [4 Teachers can identify children's points of interest from these behaviors, start conversations based on these points of interest, reveal the children's preconceptions, and then design a scientific teaching activity based on their preconceptions.

Listen to the language of young children. Only teachers who are skilled at being listeners can sensitively capture the points of interest in young children. The equal relationship between teachers and children implies respect and attention for the children. When teachers listen to young children and naturally integrate with them as equals, they can share their intense curiosity and investigative enthusiasm in a natural and genuine way. Children can truly feel the teacher's respect and support. Listening helps teachers better understand the children's preconceptions and points of interest. Teachers' listening makes children feel psychologically safe, willing to open up and express their true thoughts. Only when children express their genuine feelings can teachers more accurately grasp their interests.

3.2.2 Design conversation questions reasonably to encourage children's active expression

Well-designed questions can make conversations with children more valuable. Teachers should base their questions on the actual situation of the child, aiming to reveal the child's preconceived notions. Teachers can use methods such as designing open-ended questions and closed-ended questions to engage in conversation with children. For children, open-ended questions require them to answer in their own words, while closed-ended questions ask them to choose the most appropriate answer from several options. Teachers should combine these two approaches in their conversations, pay attention to the order of question presentation and the choice of language used, ensure that the questions are clear and appropriate for the child's knowledge and cognitive level, and avoid using professional terms or language that children cannot understand.

During the conversation, teachers should focus on children's expression of their views on certain phenomena. More importantly, they should try to understand the reasons behind these views. Therefore, teachers should encourage children to express themselves actively and provide them with opportunities to do so, helping them get used to explaining their thoughts. For children who cannot explain the reasons on their own, teachers should promptly follow up or use methods such as behavioral observation and home visits to find out why they hold certain views about something. This helps in understanding the roots of preconceptions and enables targeted changes in scientific concepts during actual teaching activities, making the implementation of science education more effective.

3.3 Carry out artistic creation activities

Painting is a form of representing preconceptions, presenting the preconceptions in children's minds through symbols. In the process of painting, children first need to extract their preconceptions, then organize them, and finally present

them on paper. This way, the preconceptions hidden in children's minds are expressed in a tangible and visible manner. Since painting activities can be conducted simultaneously for the entire class, teachers can gain an understanding of all children's preconceptions about a particular object at once, which facilitates a comprehensive analysis of the children's preconceptions and enables more efficient scientific inquiry activities. Besides painting, other artistic creation activities such as using bubble mud to shape objects or building structures with blocks also reveal children's preconceptions. Through a series of artistic creation activities, teachers can clearly grasp the children's preconceptions, understand the gap between their preconceptions and scientific concepts, and guide the selection of activity content, helping teachers design teaching activities that effectively promote the transformation of children's concepts based on their preconceptions.

The strategy of conducting artistic creation activities to explain preconceptions in young children should be approached from the following three aspects: First, before the activity begins, teachers should guide children to develop the habit of carefully experiencing and observing things in life, preparing them for the activity. Second, pay attention to making the theme content specific and vivid, with appropriate difficulty levels. Finally, after the activity, teachers should study the children's works. The research should not only focus on the content presented in the children's work but also delve into the preconceptions revealed within it.

4 Conclusion

By creating a safe discussion environment (both physical and psychological), we can guide young children to freely express their thoughts, engage in meaningful and valuable discussions, and reveal their preconceptions during the process. This is an atmosphere strategy for uncovering preschool children's preconceptions. Creating a free and equal teacher-student relationship and peer relationships, purposefully guiding discussions within the class and fostering teacher-student dialogue, helps identify points of interest in children's exploration and their "Zone of Proximal Development," thus discovering the starting point of conceptual transformation—preconception. This is a path strategy for revealing preschool children's preconceptions. Given that children's language expression abilities are not yet fully developed, it is challenging for them to accurately convey their understanding of things. Therefore, various forms of artistic creation can be used to analyze works and probe into the preconceptions children have mastered. This is an expression strategy for revealing preschool children's preconceptions.

The revelation of preschool children's pre-concept is very important for the development of subsequent teaching activities. Teachers need to have the consciousness of exploring and revealing preschool children's pre-concept, and more importantly, they need to master practical strategies and methods, so as to provide substantial basis for the design and implementation of teaching activities, so that children can really gain cognitive development and concept transformation through various field teaching activities.

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