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Education of Science for Preschool Children through Experiential Approach

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Abstract: Science education for preschool children through experiential approach is a highly feasible and promising topic in promoting the holistic development of children from their early years. Therefore, educating science through experience is an effective method to encourage curiosity and develop skills of preschool children. Preschoolers enjoy exploring and learning through experience. Experiential approach helps children understand natural phenomena around them in a natural and interesting way. This promotes the development of logical thinking, curiosity, and observation skills from an early age. The experiential approach allows children to engage with the real world, from observing natural events to practicing simple experiments. Research has established six steps for implementing effective science education for preschool children.

Keywords: Preschool, Science, Experience, Education, Experiential Approach.

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1. INTRODUCTION

In the 21st century, educating and developing scientific skills for children from the preschool stage has become a significant priority for many countries worldwide. In the context where learning environments are increasingly shaped by experiential approaches and interactive learning, applying experiential-based science education methods for preschoolers becomes extremely important. Science education for preschoolers is not only about imparting knowledge but also about the process of exploration and experiencing the world around them. In a world full of scientific and technological challenges, developing scientific skills and thinking from a young age will help children understand and adapt to an increasingly complex social environment. In this context, experiential learning in science education for preschoolers is becoming a notable trend.

Experiential learning is not only about conveying knowledge in a more visual and realistic way but also about stimulating children's natural curiosity and interest. Instead of just sitting and listening, children are encouraged to participate in practical activities, experiments, and exploration, thereby building a solid foundation of scientific knowledge from an early age.

This paper focuses on researching and analyzing the effectiveness of applying experiential approaches in science education for preschoolers. By focusing on specific research goals and questions, we

hope that the results of the study will provide a comprehensive insight into the potential and effectiveness of this method, thereby contributing to improving the quality of science education for preschoolers. Based on this, the research focuses on addressing three questions:

How does the experiential-based science education method create a positive and engaging learning environment for preschoolers?

What is the effectiveness of applying experiential-based science education method compared to other traditional education methods?

How does the application of this method impact the holistic development of preschoolers, including social skills, intelligence, and logical thinking?

2. LITERATURE REVIEW

David Sobel (1996) was one of the pioneering researchers in promoting experiential approaches in early childhood education, particularly in the field of science education. Sobel emphasized the important role of integrating real and natural experiences into the process of science learning. He explored how education can help children develop a positive and deep relationship with nature instead of fearing or worrying about the environment. Consequently, the author proposed specific educational methods to encourage children's connection

with nature through real experiences and exposure to the natural environment.

Montessori (1936) studied the operations through which children explore everyday objects and materials (comparing shells, using molds to make cakes, pink tower, red rods, brown stairs, rough/smooth knobbed cylinders; fabrics...; exploring shapes: large and small shapes (triangle, hexagon, circle, square); exploring colors (with different color boards); classification, basic puzzle assembly, pairing (using geometric trays, sorting boards according to rules); exploring sounds; parts of the body; tastes and smells (olfactory training set, taste sense); about types, properties of objects (heavy/light, sink/float, hot/cold, hard/soft, long/short...); about materials (paper, fabric, iron...); about fruits (comparing vegetables), about animals; testing strength, exploring water, soil, natural phenomena (rain, wind, sunshine)... - Practical math content, including: Number rods, recognizing natural numbers with number cards, 10 boards, tens boards, calculation boards, fraction balls; sandpaper numerals, counting sticks; recognizing color bead chains, creating color bead chains; recognizing sets of natural numbers with concrete objects, counting quantities, recognizing digits, writing numbers, adding without carry, adding with carry, adding, subtracting quantities; banking games, stamping games, mat spreads; grouping, roll call; weighing, measuring length, measuring height of objects; pouring water, pouring rice; learning about time: reading clocks, reading calendars; the growth process of plants, the life cycle of butterflies...

Jean Piaget (1952) has also demonstrated the significant role of experiential learning in the intellectual development and scientific skills of children. Both emphasized the idea of learning through hands-on experience and exploratory activities, helping children construct knowledge naturally and effectively. Piaget believed that children play an active role in the learning process, engaging in activities. This process can be likened to a "junior scientist" conducting experiments, observing, and understanding the world. As children interact with the surrounding world, they continuously acquire new knowledge. At the same time, based on existing knowledge, children construct and adjust previously held ideas to align with new information.

Recent studies by Hännikäinen (2017) and Dockett & Perry (2004, 2012) in the field of early childhood education have also demonstrated that experiential learning can create a positive and engaging learning environment for children. These studies often focus on measuring the effectiveness of experiential-based educational methods on the holistic development of children.

From these studies, it can be seen that the experiential approach in science education for preschoolers brings many benefits to children's

development (Eshach, 2007). Exploring and directly interacting with the natural environment not only helps children gain deeper insights into the world around them but also develops critical thinking, creativity, and independence.

The research of Dewey (1933) and Kolb (1984) has pointed out that learning through experience is not only an effective way to convey knowledge but also helps children develop self-learning skills and problem-solving abilities. Instead of being passive consumers of information, children are encouraged to become active participants in the learning process, thereby enhancing their abilities in observation, analysis, and reasoning.

In the era of technology, virtual learning environments and tools are also increasingly evolving. Cheng & Tsai (2016) proposed the use of digital applications and devices to create experiential learning environments for preschool children. Combining real and virtual experiences also has the potential to enhance the effectiveness of science education.

2.1. Experiential Approach in Preschool Education

Experiential education for children involves using educational activities where teachers design, organize, guide activities for children to participate in, interact directly, experience, and accumulate their own knowledge, skills, and attitudes. These activities may include using natural materials, simple practical equipment, and direct practices such as visiting botanical gardens, observing wildlife, experimenting with basic scientific phenomena like boiling water, buoyancy, and simple experiments on gravity, light, sound, etc.

This method not only helps children understand scientific concepts more deeply but also develops logical thinking, observation skills, critical thinking, and teamwork skills. Exploring science for preschoolers through experiential approaches is carried out through activities such as:

Experimentation and Practice:

Allowing children to engage in simple experiments and practical activities such as creating basic scientific phenomena (e.g., creating bubbles, making sounds with straws and water, testing the buoyancy of different materials).

Observation and Recognition:

Taking children outside to observe and recognize natural phenomena such as flowers, leaves, insects, animals. They can draw or take notes about what they see and ask questions about them. Encourage children to ask questions and seek answers through experimentation and observation.

Using Natural Materials:

Providing children with natural materials such as sand, soil, leaves, branches, and allowing them to be creative and explore with these materials.

Discussion and Dialogue:

Creating space for children to discuss what they observe and experience. Asking them open-ended questions to encourage them to reason and develop their own opinions about the world around them.

Extracurricular Learning:

Organizing field trips or outdoor activities to expose children to natural and scientific environments outside the classroom. Combining play and learning activities to create an engaging and positive learning environment for children. Through this, children will be encouraged to develop curiosity, critical thinking, and problem-solving skills in the process of exploring and learning about the world around them.

2.2. Principles of Organizing Science Exploration for Preschoolers through Experience

A. Ensure Alignment with Objectives and Content of Preschool Education Programs

Designing science exploration activities for preschoolers through an experiential approach should align closely with the objectives and content of preschool education programs, including:

Providing children with knowledge about their surrounding life, social relationships, and situations they may encounter in daily life.

Encouraging children to apply existing knowledge and experiences to solve real-life situations. Through this process, children's knowledge, skills, and attitudes will be used to help them develop independence, creativity, connections, and verify existing knowledge with new knowledge gained from experiences. Children will accumulate, verify, adjust, and respond to new knowledge and understanding acquired from real experiences.

Encouraging active and enthusiastic participation and experimentation by children in real-life situations.

B. Ensure Theoretical Soundness

The design of some science exploration activities for preschoolers through an experiential approach should be based on the characteristics of experiential activities, science exploration activities, and the structure and content of experiential-based science exploration activities.

Ensure the child's role as the subject when participating in activities.

C. Ensure Practicality

To design some science exploration activities for preschoolers through an experiential approach, it is

necessary to rely on practical situations and be appropriate to the actual situation in preschools.

Approaching experiential learning in science exploration for preschoolers is an educational method focused on providing opportunities for children to explore and discover the world around them through hands-on activities and direct experiences. This method promotes natural curiosity and exploration, encourages active participation, and facilitates learning through experimentation, observation, and discussion.

2.3. Designing Science Exploration Activities for Preschoolers through Experiential Approach

Stage 1:

Real-life Experience. In stage 1, the following tasks need to be carried out: Selecting topics/themes, defining the objectives of the activities, determining the content of real-life experiences for children, preparing the environment for children's real-life experiences, guiding children through the process of real-life experiences. Children directly participate in activities organized by teachers based on themes and events directly related to daily life. The quality of the experience depends on the level of children's involvement, the quality of specific situations experienced, and the reality they are exposed to.

Stage 2:

Sharing Experiences. Experiences gained through children's exploration need to be shared with others to be deeply engraved, acknowledged, adjusted, accurately understood, thus leaving behind beautiful emotional imprints on children. This process will create conditions for developing children's thinking process from a low level (recording information) to a high level (understanding the cause-and-effect relationship) and is concretized through answering questions.

Stage 3:

Drawing Lessons for Oneself. Children learn new knowledge and experiences, creating new understandings. The knowledge and experiences children consolidate are based on the analysis and evaluation of experiences gained through the previous stages.

Stage 4:

Applying Experience to Life. Children apply the knowledge and experiences they have just acquired to new contexts or events, and their knowledge and experiences are gradually enhanced.

3. RESEARCH METHODS

3.1. Empirical Research Method:

Collecting data from preschools or early childhood education institutions using experiential approaches in science education. Utilizing direct observation techniques or note-taking to observe and evaluate children's reactions during the learning process.

Conducting interviews with teachers, parents, and educational experts to gather opinions and comments on the effectiveness of this method.

3.2. Qualitative Research:

Employing directed interview methods to gain deeper understanding of teachers', parents', and children's experiences and perspectives regarding the application of experiential approaches in science education. Facilitating discussion groups or focus groups to discuss and analyze specific experiences of relevant parties.

3.3. Experimental Research:

Organizing experiments or controlled condition tests to compare the effectiveness of experiential approaches with other traditional educational methods. Conducting measurements and analyzing progress in children's knowledge and skills before and after participating in science education programs based on experience.

3.4. Evaluation Research:

Using evaluation methods to quantify and assess the effectiveness of experiential approaches in science education. Constructing evaluation indices and assessment tables to measure the progress of children in specific scientific skills.

4. RESEARCH RESULTS AND DISCUSSION

4.1. Current Situation of Implementing Experiential Approach in Science Education for Preschool Children in Preschools

According to a recent study by the Ministry of Education and Training of Vietnam, only about 30% of preschools in Vietnam use experiential-based science education methods and hands-on activities. The majority of the remaining schools still rely on traditional textbook-based teaching methods.

Data from UNESCO shows that over 60% of preschools in Vietnam are still facing shortages of physical resources, including classrooms, equipment, and educational materials. This limits the ability to implement practical activities and experiential learning in science education. Only about 40% of preschool teachers have been trained in experiential-based educational methods. Most teachers still need to develop skills and knowledge in this area to effectively apply them in practice.

Some non-profit organizations such as Save the Children and VVOB have implemented support programs and training for teachers on experiential approaches in science education. Schools supported by these organizations often achieve positive results in implementing these methods, enhancing children's interest and understanding of science.

In summary, the implementation of experiential approaches in science education for preschool children in preschools in Vietnam is still diverse and faces many challenges. However, efforts and successful models have been recognized, especially with support from external organizations and resources. This indicates the potential to improve the quality of science education for preschool children through increased investment in teacher training, provision of physical resources, and support from government and non-governmental organizations. Additionally, sharing experiences and learning from successful schools is also crucial for spreading good models and improving the effectiveness of science education for preschool children in Vietnam

4.2. Factors Influencing the Application of Experiential Approach in Science Education in Preschools

Some preschools face difficulties in providing the necessary physical resources to conduct science exploration activities. Shortages of equipment, experimental materials, and suitable spaces can reduce the realism and effectiveness of learning experiences. Additionally, a lack of knowledge and skills in designing and implementing science exploration activities may be a barrier for teachers. Deep training and support, not only in content but also in teaching methods, are crucial.

Furthermore, some preschools may encounter challenges in organizing science exploration activities due to concerns about child safety and risk management. This can limit children's freedom and exploration abilities. Additionally, the attitudes and awareness of parents can also influence the application of experiential approach in science education. Some parents may prioritize knowledge transmission over exploration and experimentation.

Lastly, limitations in school policies and budgets can also reduce the ability to implement experiential approach in science education. Lack of supportive policies and financial resources can delay or diminish investment in these activities.

These factors together create an environment that may reduce the feasibility and effectiveness of applying experiential approach in science education in preschools in Vietnam. Overcoming these challenges requires support from educational management levels, local and national organizations, as well as active participation from teachers, parents, and the community.

4.3. Organizing Science Exploration Activities for Preschoolers through Experiential Approach Effectively.

Step 1:

Planning and Preparation. Identify what you want children to learn and experience through the activities. Choose a theme or topic: Select science topics suitable for the development and interests of

preschoolers, such as water, animals, plants, etc. Prepare the necessary materials and equipment for the activities, including natural materials and supporting tools.

Step 2:

Implementation of Activities. Begin by posing questions or stimulating children to ask questions about the theme or specific phenomena. Guide children to engage in experimental activities or direct experiences to explore the answers to their questions. Encourage children to use their curiosity and creativity to explore and experiment with available materials and equipment.

Step 3:

Guidance and Support. Instruct children during the activities, but also provide opportunities for them to explore and discover on their own. Support children when they encounter difficulties and encourage them to continue experimenting and exploring.

Step 4:

Observation and Evaluation. Monitor and observe children's participation and progress during the activities. Provide positive feedback and constructive feedback to encourage children's development and learning.

Step 5:

Summarize and Draw Lessons. Summarize the results and insights of children from the activities. Draw conclusions and experiential lessons from what children have learned and experienced.

Step 6:

Create Opportunities for Knowledge Expansion. Connect science explorations with other concepts or skills in the educational curriculum. Create opportunities for children to use new knowledge and skills in activities outside the classroom.

5. CONCLUSION

Science education for preschoolers plays a crucial role in laying the foundation for comprehensive development in children. During the early years of life, children often exhibit curiosity and willingness to explore the world around them. This helps preschoolers understand and retain knowledge more deeply. Although experiential learning is a beneficial method for preschoolers, it may face challenges regarding resources and safety. Thorough preparation and careful supervision are necessary to ensure that science activities are safe and age-appropriate for children. To successfully implement experiential learning in science education for preschoolers, support from parents and teachers is essential. There needs to be close collaboration between

families and schools to create optimal conditions for conducting science education activities. To ensure the attractiveness and effectiveness of experiential learning in science education, there should be diversity in activities and resources provided to children. Activities may include observation, simple experiments, investigations, and exploration of the surrounding world.

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