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Teacher Intervention Timing and Support Strategies in Children's Science Inquiry: A Case Study

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Abstract

Teachers' timely intervention is an important condition to support children's independent science inquiry and promote the development of science literacy. In view of the coexistence of excessive guidance and insufficient support of teachers in children's science inquiry activities, this study uses the qualitative case study method, takes the sand and water exploration and construction game in large classes as typical cases, and uses the research ideas of classroom observation, teacher interview and teaching document analysis to explore the judgment basis of teachers' intervention time, support strategies and the relationship between teachers' intervention time and children's inquiry behavior. The case analysis shows that teachers' intervention should be based on children's actual inquiry needs, give full observation and waiting in the independent exploration stage, guide children to solve problems through open-ended questions and appropriate material support in the exploration hindered stage, and promote the formation of science understanding through experience exchange in the exploration in-depth stage. The effectiveness of teachers' intervention depends not only on the timing of intervention, but also on whether the support methods can promote children's continuous thinking and independent attempt. The research puts forward the teacher support path of "observation and judgment - timely intervention - support inquiry - Dynamic withdrawal", which provides practical reference for optimizing the teacher guidance behavior in children's science inquiry activities.

Keywords: Children's Science Inquiry, Timing of Teacher Intervention,Teacher Support Strategies, Autonomous Learning, Case Study

Introduction

Science inquiry is an important way for young children to understand the natural world, accumulate science experience, and develop preliminary science thinking. The "Guidelines for Learning and Development of Children Aged 3-6" (Ministry of Education, 2012) points out that

the core of science learning for young children lies in stimulating interest in exploration, experiencing the process of exploration, and developing preliminary exploration abilities, emphasizing the promotion of young children's learning through direct perception, personal experience, and hands-on activities. Therefore, early childhood science education should not only focus on the acquisition of science knowledge, but also attach importance to the process of young children actively discovering problems, proposing hypotheses, conducting hands-on experiments, and solving problems. In this process, how to balance the independent exploration of young children and the appropriate intervention of teachers is an important issue that affects the quality of science exploration activities. Premature teacher intervention may limit children's independent thinking, while insufficient support may prevent them from engaging in deeper exploration.

From a theoretical perspective, the scaffolding teaching theory provides an important basis for teacher intervention. Wood et al. (1976) pointed out that adults can assist learners in completing tasks that are difficult to accomplish independently through appropriate support. Vygotsky's (1978) zone of proximal development theory further emphasizes that teachers should provide appropriate assistance based on learners' actual abilities. This indicates that teacher support should not be limited to direct demonstration or knowledge transmission, but should be dynamically adjusted according to the exploratory needs of young children. However, scaffolding instruction not only involves the selection of support methods, but also the judgment of intervention timing. Premature intervention may undermine children's independent exploration, whereas delayed intervention may make it difficult for them to overcome challenges in their inquiry.

At the same time, inquiry based learning emphasizes that young children actively construct experiences through asking questions, forming hypotheses, conducting experiments, and communicating results (National Research Council, 2000). This theory emphasizes the subjectivity of young children, but it does not mean that teachers completely withdraw. Compared with scaffolding teaching, inquiry based learning focuses more on the process of children's active participation and experience construction, while scaffolding teaching emphasizes how teachers can provide appropriate support based on children's actual needs. The two have complementarity, but in specific teaching practice, it is still worth further research on how to combine children's exploration status to judge the timing of intervention and choose appropriate support methods.

Previous studies have explored the role of teacher support from the perspectives of self-directed learning, teacher guidance, and science inquiry, involving strategies such as environment creation, material placement, open-ended questioning, and demonstration guidance (Zhang, 2025). However, existing research has focused more on the support methods adopted by teachers, the relationship between intervention timing and support strategies, and the dynamic changes in children's exploratory behavior before and after intervention, with relatively insufficient attention. In addition, early intervention by teachers may limit children's autonomous experimentation, and insufficient support may also limit exploration to superficial operations (Wang, 2024; Huang, 2026). Therefore, it is necessary to start from specific exploration situations, further analyze how teachers identify children's exploration needs, and adjust support methods based on children's behavioral performance.

Based on this, this study adopts a qualitative case study method, selecting two typical cases of large class sand and water exploration and construction games, combined with classroom observation, teacher interviews, and teaching document analysis, focusing on three issues: firstly, how teachers judge the timing of intervention based on children's exploration behavior; Secondly, how teachers can use strategies such as observation waiting, open-ended questioning, and material adjustment to provide appropriate support; Thirdly, how different intervention methods affect the process of independent exploration and problem-solving in young children.

This study combines the principles of timely support and dynamic adjustment in scaffolding teaching with the principles of autonomous exploration and experiential construction in inquiry based learning, and analyzes the relationship between teacher intervention timing and support strategies from a dynamic process perspective. The study not only focuses on the support methods adopted by teachers, but also on the exploratory performance of children before intervention, changes in children's behavior after intervention, and timely adjustment and withdrawal of teacher support. Through case analysis, extract the teacher support path of "observation and judgment - timely intervention - inquiry support - dynamic withdrawal", providing practical reference for optimizing teacher guidance in early childhood science exploration activities.

Literature Review

Research on Children's Science Inquiry and Active Learning

Children's science inquiry is an active learning process involving observation, comparison, prediction, experimentation, and problem-solving. International research emphasizes experiential learning and children's active construction of knowledge. Dewey (1938) highlighted the importance of learning through experience, while Piaget emphasized knowledge construction through interaction with the environment. Eshach and Fried (2005) argued that young children are capable of science learning, which promotes curiosity and science understanding. Ramanathan et al. (2022) further emphasized integrating science inquiry into play and everyday experiences to support children's active exploration.

Chinese research similarly emphasizes children's autonomy and active participation in science learning. The “Guidelines for the Learning and Development of Children Aged 3–6” (Ministry of Education, 2012) advocate direct perception, personal experience, and hands-on activities to develop children's inquiry abilities. Chen (2020) highlighted problem-driven learning, encouraging children to identify and solve problems independently. Ni (2024) emphasized integrating science education into classroom activities, play, and daily life to promote autonomous exploration. Feng et al. (2024) further suggested that science activities should combine practical operation, cognitive exploration, and social interaction to enhance children's thinking and communication skills.

Overall, international and Chinese studies emphasize a shift from knowledge transmission toward inquiry-based learning. Both perspectives recognize the importance of meaningful experiences, appropriate materials, and supportive learning environments in developing children's science inquiry abilities. These findings provide a theoretical foundation for examining how teacher intervention and instructional support can facilitate children's autonomous science exploration.

Research on Teacher Intervention and Scaffolding Support

Teacher intervention refers to the educational behavior that teachers promote children's learning through questioning, prompting, material adjustment and environmental support according to their inquiry state. Foreign studies are mainly based on Vygotsky's zone of proximal development theory and Wood's (1976) scaffolding theory, emphasizing that adults should provide appropriate help according to children's ability, and gradually reduce support with the development of their ability to solve problems independently. Skene et al. (2022) systematic review further shows that appropriate adult guidance and children's autonomous choice can be combined with each other, but the effect varies according to the learning field and implementation method.

Chinese scholars have also carried out case studies on Teachers' scaffolding support. Gao and Tang (2019) found through the analysis of 10 kindergarten science activity cases that teachers can flexibly use strategies such as questioning, feedback, explanation, suggestion and demonstration to support children's independent inquiry around science issues. This study emphasizes that teachers' support should take into account problem driven, science experience acquisition and emotional motivation, which provides a practical basis for teachers' intervention in kindergarten science education.

Research on the Opportunity and Support Strategy of Teachers' Intervention

The effectiveness of teacher intervention depends not only on the guidance strategies employed but also on the timing of intervention. In international research, Nayfeld et al. (2011) examined the balance between children's autonomous exploration and teacher guidance, emphasizing the importance of providing appropriate support while preserving children's autonomy. Through action research on low-structured material play among five-year-old children, Zeng and Ng (2025) found that combining uninterrupted child-directed play with subsequent open-ended questioning can enhance children's science process skills and deepen their science inquiry. These studies highlight the importance of appropriately timed teacher intervention in supporting children's autonomous exploration and science learning.

Chinese research has gradually paid attention to the specific implementation of teachers' intervention behavior. Zhang (2025) proposed that teachers should take into account the roles of resource providers, activity guides, behavior observers and thought promoters, and support children's science inquiry by creating inquiry environments, building problem ladders and conducting process guidance. This reflects that domestic research has gradually shifted from general guiding principles to specific support strategies.

Overall, both international and Chinese studies have emphasized the importance of balancing teacher support with children's autonomous inquiry, highlighting strategies such as open-ended questioning and material support. However, further research is needed to understand how teachers determine appropriate intervention timing based on children's ongoing inquiry behaviors and how these interventions influence subsequent exploration. In this context, the present study examines sand and water exploration and construction play as two typical cases, analyzing the dynamic relationship between intervention timing, support strategies, and children's inquiry behaviors through three interconnected stages: children's behaviors before intervention, teachers' intervention practices, and children's responses after intervention.

Methodology

This study adopts a qualitative case study approach, focusing on science inquiry activities involving kindergarten children aged 5–6. Two typical cases, “The Magical World of Sand and Water: Exploring Water Flow and the Properties of Sand” and “Wonderful Construction: Exploring Stability and Balance,” were selected to examine the relationships among the timing of teacher intervention, instructional support strategies, and children's inquiry behaviors. Both activities are highly open and operational. Children can carry out science inquiry through independent attempt, problem discovery, adjustment scheme and repeated verification. The situation of inquiry obstruction and problem solving in the activities also provides a specific basis for the analysis of teachers' intervention behavior.

In order to fully understand teachers' intervention behavior and its impact on children's inquiry process, the study used three methods to collect data: classroom observation, semi-structured teacher interview and teaching document analysis. Classroom observation focused on recording the timing of teacher intervention, support methods and children's behavioral responses, and combined with activity photos and videos to analyze the changes of children's inquiry behavior before and after intervention; Teacher interviews mainly understand the judgment basis, strategy selection and effect evaluation of teacher intervention; The analysis of teaching documents examines the relationship between the preset teaching objectives and the actual guiding behavior through activity plans, observation records and teaching reflection.

In the process of data analysis, the research uses the theme analysis method, taking the teacher intervention event as the basic analysis unit, sorts out, codes and compares the data from different sources, identifies support behaviors such as observation and waiting, open-ended questions, material adjustment and organizational discussion, and analyzes the suitability of different support methods combined with the inquiry performance of children before and after intervention. On this basis, through cross case comparison, the judgment basis and effective support strategies for the timing of teacher intervention are summarized. At the same time, the triangular cross validation among classroom observation, teacher interviews and teaching documents is used to improve the credibility of the research results.

Result and Case Analysis

Case 1: Judgment and Adjustment of Teachers' Intervention Opportunity in Sand and Water Exploration Activities

Sand water activities provide children with the opportunity to operate independently and explore the law of water flow. This case selects three typical events, namely, the initial construction of the watercourse, the obstruction of water flow and the improvement of the watercourse, to analyze how teachers judge the intervention time according to children's inquiry state, and promote continuous inquiry through different support methods. The table below presents teachers’ intervention behaviors during the activity, as well as children’s behaviors and responses before and after teacher intervention.

Table 1
Analysis of Teachers' Intervention Behavior and Children's Reaction in Sand and Water Exploration Activities

Exploration Stage	Children's Behavior Before Teacher Intervention	Teacher Intervention Strategies	Children's Responses After Teacher Intervention
Initial construction of waterway: independent exploration	Children independently dug channels in the sand and connected water pipes. When they noticed that the water was not flowing smoothly, they took the initiative to adjust the channels and repeatedly tested their designs.	The teacher observed and waited without directly demonstrating or providing solutions.	Children continued adjusting the channels and gradually discovered the relationship between the direction of the channels and water flow.
Obstructed Water Flow: Encountering Challenges During Exploration	Children repeatedly increased the amount of water or deepened the sand channels, but the problem remained unresolved, and their actions became increasingly repetitive.	The teacher guided children's observations by asking questions such as, "Where does the water stop flowing?" and "What would happen if you changed the height or slope of the channel?"	Children began comparing different channel structures, adjusting slopes and connections, and testing the effectiveness of their modifications by pouring water through the channels.
Water Channel Improvement: In-depth Exploration	Children attempted to extend the water channels, but leakage or blockages occurred at the connections, and the existing materials were insufficient to meet their needs.	The teacher provided additional pipes, connectors, and supporting materials, encouraged children to combine them independently, and gradually reduced guidance.	Children compared different connection methods, repeatedly modified the channel structures, and engaged in more in-depth exploration.

From Table 1, it can be seen that the judgment of teachers' intervention timing mainly depends on whether children can continue to explore independently. At the initial stage of waterway construction, although children encounter difficulties, they can still take the initiative to adjust the plan, and teachers reserve the space for their own trial and error through observation and waiting. When children repeatedly operate but lack new solutions, the teacher guides them to re observe and compare through open-ended questions, so that the exploration turns from repeated attempts to purposeful verification. With the deepening of exploration, teachers meet children's new exploration needs through supplementary materials, and gradually withdraw after they can operate independently. This case shows that teachers' intervention should not be based on whether children encounter difficulties, but on whether their inquiry can continue to advance. By observing the dynamic adjustment of waiting, timely questioning and material support, teachers can not only avoid excessive intervention, but also provide necessary conditions for children to continue to explore.

Case 2: The Selection and Implementation of Teacher Support Strategies in the Constructive Play

Constructive play provides practical opportunities for children to explore object balance and structural stability. This case selects three typical events: self construction, high-rise building collapse and scheme improvement to analyze how teachers choose support strategies according to children's inquiry needs. The table below presents teachers' intervention behaviors during the activity, as well as children's behaviors and responses before and after teacher intervention.

Table 2
Analysis of Teacher Support Strategies and Children's Response in Constructive Play

Exploration Stage	Children's Behavior Before Teacher Intervention	Teacher Intervention Strategies	Children's Responses After Teacher Intervention
Independent Construction: Free Design	Children independently selected building blocks to design structures such as tall buildings and bridges, continuously adjusting their construction plans.	The teacher provided a variety of materials without prescribing specific construction methods, primarily focusing on observation.	Children independently adjusted the positions and quantities of building blocks, developing different construction plans.
Building Collapse: Problem-Solving	Tall buildings repeatedly tilted or collapsed, and children continued using the same methods without successfully resolving the problem.	The teacher encouraged children to think critically by asking questions such as, "Where does the building start to collapse?" and "What would happen if the base were wider?"	Children modified the base structures and support methods, repeatedly rebuilding their structures to test their hypotheses.
Design Improvement: In-depth Exploration	Children attempted to construct more complex structures, but encountered further challenges related to stability.	The teacher introduced additional types of building blocks, facilitated peer discussions, and gradually reduced guidance.	Children learned from their peers' experiences, compared the stability of different structures, and continuously improved their constructions.

It can be seen from Table 2 that the choice of teachers' support strategies is closely related to children's inquiry needs. In the stage of independent construction, teachers reduce the directive guidance, so that children can design and adjust works according to their own experience. When high-rise buildings collapse repeatedly and children lack new solutions, teachers guide them to pay attention to structural stability through open-ended questions, so that exploration turns from simple repetition to observation, comparison and verification. In the program improvement stage, teachers expand exploration space through material adjustment and peer communication, and gradually reduce guidance after children can solve problems independently. This case shows that the effective support of teachers is not to directly provide answers, but to choose appropriate ways to help children discover problems, verify conjectures and improve solutions according to their inquiry needs. Teachers' timely adjustment of the degree of intervention in the process of support is helpful to maintain children's autonomy and promote the continuous deepening of science inquiry.

Cross case analysis: dynamic matching of teachers' intervention timing and support methods

Based on the two cases, it can be found that teachers' intervention should be flexibly adjusted according to children's inquiry status and actual needs. It should not only respect children's space for independent exploration, but also provide appropriate support when necessary. At different stages of inquiry, teachers' intervention opportunities and support methods are different. The timing and support methods of teacher intervention reflected in the two cases are shown in the table below.

Table 3
Comparison of Teachers' Intervention Timing and Support Methods in Different Inquiry Stages

Exploration Stage	Typical Children's Behaviors	Teacher Support Strategies
Independent Exploration	Active engagement in hands-on activities and repeated experimentation.	Observe and wait, delaying intervention.
Challenges in Exploration	Repeated failures and a lack of alternative approaches.	Ask timely questions to stimulate thinking.
In-depth Exploration	Generate new questions and hypotheses.	Adjust materials to support deeper exploration.
Sharing Experiences	Share discoveries and explain observed phenomena.	Facilitate discussions and encourage reflection.

It can be seen that the effectiveness of teacher intervention depends not only on the timing of intervention, but also on the matching degree of support methods and children's needs. Based on two cases, we can conclude the support path of "observation and judgment - timely intervention - support exploration - Dynamic exit". Teachers judge children's inquiry needs through continuous observation, provide help when necessary, and timely adjust the degree of guidance according to children's subsequent performance. When children can continue to explore independently, teachers should take the initiative to withdraw and return the initiative of exploration to children, so as to achieve a dynamic balance between teachers' support and children's independent exploration.

Discussion

Shifting Teachers' Interventions from a Task-Completion Orientation to an Inquiry-Process Orientation

In the practice of early childhood science education, teachers tend to take the completion of the activity objectives as an important basis for evaluating the teaching effect, so they tend to correct errors in time or directly provide operation methods. However, the educational value of early childhood science inquiry is not only reflected in the final results, but also in the process of finding problems, putting forward conjectures and repeatedly verifying. For example, in sand water activities, the inability of water to flow smoothly does not mean the failure of exploration, but may become an important opportunity for children to discover the relationship between the flow direction and the waterway structure. In the construction activities, the collapse of building blocks may also cause children to think about the structural stability. Therefore, teachers should re recognize the educational value of failure and trial and error in children's inquiry process, and take whether children continue to think, actively adjust and try to solve problems as an important basis for judging the need for intervention.

Balancing Children's Autonomous Inquiry and Teacher Guidance

Respecting children's autonomy does not mean that teachers do not intervene at all. Due to the limited life experience and cognitive ability of young children, appropriate support is still necessary when they encounter problems that are difficult to solve independently. The scaffolding support theory emphasizes that adults should provide appropriate help according to children's actual ability, and gradually reduce support with the development of children's ability. This provides a theoretical basis for teachers to grasp the degree of intervention in science inquiry activities.

Therefore, teachers should avoid understanding guidance and letting go as two opposite ways, and should adjust dynamically according to children's inquiry needs. Provide exploration space when children can solve problems independently, provide appropriate help when children encounter continuous difficulties, and gradually withdraw after children regain the ability to explore independently.

Diversifying Teacher Intervention Strategies

Teachers' intervention should not only rely on language guidance, but also use the methods of material adjustment, environmental support and peer communication. Open questioning can help children rethink problems; Material adjustment can expand children's operation and experimental conditions; Peer communication can help children compare different views and solutions. Different support methods have different applicable situations. Teachers should choose flexibly according to the actual needs of children, rather than using a fixed guidance mode. In addition, teachers should also pay attention to the changes of children's behavior after intervention. If children can re ask questions, adjust operation methods or carry out further experiments, it shows that support may have a positive effect on the inquiry process; If children only complete tasks according to the requirements of teachers, they need to reflect on whether the intervention is excessive. Therefore, the effectiveness of teachers' intervention should be judged by children's follow-up inquiry behavior, not only by whether teachers complete the guidance task.

Conclusion

This study focuses on the problems of teachers' intervention timing and support strategies in children's science inquiry activities. Through the analysis of two typical cases of sand and water exploration and construction game, it discusses the behavior of children in different stages of inquiry, the judgment basis of teachers' intervention and the corresponding support methods, and further defines the role orientation and guiding principles of teachers in children's science inquiry activities.

The case analysis shows that the effective intervention of teachers should be based on the continuous observation and accurate judgment of children's inquiry behavior. When children are able to operate independently, think actively and try to solve problems, teachers should respect the dominant position of children, give them enough time and space to explore, and avoid early intervention that affects the process of children's independent thinking. When children encounter difficulties in the process of inquiry and still cannot make progress after repeated attempts, teachers can guide children to find problems and adjust their thinking through open-ended questions and appropriate prompts. When children have new interest in inquiry or need for further exploration, teachers can provide necessary support for children

by enriching operation materials, creating communication opportunities and guiding peer cooperation, so as to promote inquiry activities.

On this basis, this study proposes a teacher support path of "observation and judgment - timely intervention - support exploration - Dynamic withdrawal". The path emphasizes that teachers' intervention is not a fixed guidance process, but needs to be dynamically adjusted according to children's inquiry state, cognitive level and actual needs. Teachers should not only pay attention to children's difficulties and needs in activities, but also grasp the appropriate opportunity to withdraw, and gradually return the initiative to explore and solve problems to children, so as to realize the coordination and unity between teachers' effective support and children's independent inquiry.

This study is mainly based on the analysis of two typical activity situations. The number of cases and the scope of the study have certain limitations, and the relevant conclusions still need to be further tested in combination with the observation data in the real classroom. Future research can explore the characteristics and actual effects of teachers' intervention behavior in different science inquiry activities through continuous observation, cross teacher comparison and multi case analysis, so as to provide more sufficient practical basis for improving the quality of kindergarten science education activities.

References

Chen, M. G. (2020). Improving rural kindergarten teachers' professional competence through problem-oriented teaching research [In Chinese]. *Fujian Education*, (42), 31–32.

Dewey, J. (1938). *Experience and Education*. Macmillan.

Feng, Y. H., Guo, Q. H., Lin, C., & Zhang, J. B. (2024). A study of the model and cases of evidence-based science teaching practices in kindergartens [In Chinese]. *Studies on Science Popularization*, 19(6), 37–46. https://doi.org/10.19293/j.cnki.1673-8357.2024.06.004

Fleer, M. (2009). Understanding the dialectical relations between everyday concepts and science concepts within play-based programs. *Research in Science Education*, 39, 281–306. https://doi.org/10.1007/s11165-008-9085-x

Gao, H. Y., & Tang, C. L. (2019). A case study of scaffolding strategies in kindergarten science education activities [In Chinese]. *Studies on Science Popularization*, 14(1), 5–12, 106. https://doi.org/10.19293/j.cnki.1673-8357.2019.01.001

Hamel, E., Joo, Y., Hong, S. Y., & Burton, A. (2021). Teacher questioning practices in early childhood science activities. *Early Childhood Education Journal,* 49, 375–384. https://doi.org/10.1007/s10643-020-01075-z

Huang, P. P. (2026). Effective observation, analysis, and intervention: Teachers' observation and guidance strategies in kindergarten learning centers [In Chinese]. *New Class Teacher*, (26), 25–26.

Ministry of Education of the People's Republic of China. (2012). *Guidelines for the learning and development of children aged 3–6* [In Chinese]. http://www.moe.gov.cn/jyb_xwfb/xw_zt/moe_357/jyzt_2015nztzl/xueqianjiaoyu/yaowen/202104/t20210416_526630.html

National Research Council. (2000). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*. National Academies Press.

Nayfeld, I., Brenneman, K., & Gelman, R. (2011). Science in the classroom: Finding a balance between autonomous exploration and teacher-led instruction in preschool settings. *Early Education and Development*, 22(6), 970–988. https://doi.org/10.1080/10409289.2010.507496

Ni, W. Z. (2024). Strategies for cultivating young children's science literacy from the perspective of play-based curriculum [In Chinese]. *Asia-Pacific Education*, (21), 142–144. https://doi.org/10.16550/j.cnki.issn.2095-9214.2024.21.043

Ramanathan, G., Carter, D., & Wenner, J. (2022). A framework for science inquiry in preschool. *Early Childhood Education Journal*, 50, 1263–1277. https://doi.org/10.1007/s10643-021-01259-1

Skene, K., O'Farrelly, C. M., Byrne, E. M., Kirby, N., Stevens, E. C., & Ramchandani, P. G. (2022). Can guidance during play enhance children's learning and development in educational contexts? A systematic review and meta-analysis. *Child Development*, 93(4), 1162–1180. https://doi.org/10.1111/cdev.13730

Tian, Q. (2026). Challenges and solutions in kindergarten science education from the perspective of life education: Reflections based on embodied cognition theory [In Chinese]. *Life Education*, (25), 87–90.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.

Wang, Y. Q. (2024). Teachers' observation and guidance strategies in kindergarten learning centers [In Chinese]. *Intelligence*, (5), 93–95.

Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17(2), 89–100. https://doi.org/10.1111/j.1469-7610.1976.tb00381.

Zeng, H. Q., & Ng, S. C. (2025). Free play matters: Promoting kindergarten children's science learning using questioning strategies during loose parts play. *Early Childhood Education Journal*, 53, 2373–2388. https://doi.org/10.1007/s10643-024-01741-6

Zhang, J. H. (2025). Teacher guidance strategies in young children's science inquiry activities [In Chinese]. *Asia-Pacific Education*, (22), 47–50. https://doi.org/10.16550/j.cnki.issn.2095-9214.2025.22.015