ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202512_8(12).0036

How Rural Outdoor Activities Promote Children's Cognitive Development: Based on the Embodied Cognition Concept in Piaget's Genetic Epistemology

Kai Chen

Baotou Teachers' College, Inner Mongolia University of Science and Technology, Baotou 014030, China

Abstract

The concept of embodied cognition within Piaget's genetic epistemology includes two main aspects: the genesis of cognition is based on the organism's body and actions, and cognition is a process of bidirectional construction through the interaction between subject and object through bodily actions. Based on this concept, this paper explores the impact of rural outdoor activities on children's cognitive development, which is mainly reflected in the following aspects: (1) Rural outdoor autonomous play respects children's agency, reconstructs modern teacher-child relationships, and facilitates the development of children's cognitive abilities; (2) Rural outdoor educational resources are physically operable for children, satisfy the need for physical and mental participation, and consolidate the sensorimotor foundation for cognitive development; (3) The authentic socio-cultural context and natural environment in rural areas stimulate children's positive emotions and intrinsic motivation, furnishing a meaningful context and impetus for deep cognitive learning.

Keywords

Children's Cognitive Development; Piaget's Genetic Epistemology; Embodied Cognition; Rural Outdoor Activities.

1. Introduction

The report of the 20th National Congress of the Communist Party of China proposed a Chinese-style modernization path characterized by harmonious coexistence between man and nature. As a key force empowering rural revitalization, rural education bears the critical mission of promoting modernization. Through comprehensive analysis of existing literature and observations from practical work, it is found that rural preschool education faces constraints on high-quality development, such as blind pursuit of standardization, neglect of local characteristics and cultural heritage, and uneven distribution of educational resources. Therefore, how to achieve balanced and high-quality development of rural preschool education while maintaining local cultural characteristics has become a critical issue to be solved urgently.

Embodied cognition theory emphasizes that cognition is realized through the interaction between the body and the environment in specific contexts. Its inherent fit with rural outdoor activities is evident in their shared attributes and value orientations, showing high consistency in terms of embodiment, situatedness, and interactivity. Embodied cognition opposes the traditional dualistic separation of mind and body, advocating that cognition arises from the integrated activity of the body and mind [1]. The state of the body directly influences cognitive processes and forms an integrated system with the environment. Rural outdoor activities place children in natural environments close to their real-life experiences, aligning with their innate needs while providing conditions for physical activity. They promote the integrated development of cognition and emotion through interaction with the natural environment,

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202512_8(12).0036

representing an important pathway for achieving high-quality development in rural preschool education.

In light of this, this paper attempts to unearth the embodied cognition concepts within Piaget's genetic epistemology. From this perspective, it then analyzes the impact of rural outdoor activities on children's cognitive development, exploring pathways for the high-quality development of outdoor activities in rural kindergartens.

2. The Concept of Embodied Cognition in Piaget's Genetic Epistemology

2.1. The Genesis of Cognition Must Be Premised on the Organism's Body and Actions

Piaget placed cognitive development on a biological foundation, arguing that the genesis and development of cognition cannot be separated from the subject's biological conditions. He contended that cognitive activity begins with sensorimotor activity, positing that the biological conditions of the human body, based on the coordination of actions, play a crucial role in abstract cognitive activities [2]. During this period, children primarily rely on bodily actions to interact with the objective environment, engaging in trial and error through practical actions like grasping, touching, and crawling, thereby constructing initial causal relationships and physical experiences. These early bodily experiences lay the foundation for all subsequent complex cognitive functions, clearly indicating that cognitive processes are deeply rooted in the individual's bodily experiences.

Even upon entering the period of verbal-representational thought, where language becomes an important cognitive tool, the role of the body does not disappear. The acquisition and comprehension of language are fundamentally underpinned by extant body schemas. Children expand their perception of the environment through body schemas, subsequently forming more complex and abstract concepts. Cognitive development is a continuous process where the interaction between body and environment plays a crucial role at every stage. This aligns with what embodied cognition theory emphasizes—that cognition originates from physiological perception, neural structure, and motor patterns, and that cognitive processes are dynamic and interactive.

2.2. Cognition is a Bidirectional Construction Process Through the Interaction of Subject and Object via Bodily Actions

Piaget employed the concepts of schema, assimilation, accommodation, and equilibrium to delineate the core mechanism of cognitive development. He viewed cognition as a continuous construction process. In the sensorimotor stage, cognitive development begins with the body and activity. The progression from action to thought is a process of differentiation achieved by transforming concrete behaviors into abstract ideas. Activity occurs not only at the beginning of thought but throughout the entire process of cognitive development. Assimilation refers to the individual incorporating external stimuli into existing cognitive structures; when existing schemas cannot adapt to new stimuli, the individual needs to adjust internal structures, i.e., accommodation. Through the mechanism of equilibrium, the subject continuously adjusts cognitive structures to cope with environmental changes.

The process of bidirectional construction is essentially the result of the subject interacting with the objective environment through physical activity. The subject acts upon the environment through bodily actions, and the feedback from the environment prompts the subject to adjust their action strategies and cognitive structures. Piaget specifically noted that cognitive structures function in a recursive cycle and have an inherent tendency towards equilibrium through self-regulation [3]. The formation of higher-level cognitive structures stems from the internalization and reflection upon the coordination of actions. This means that abstract logico-

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202512_8(12).0036

mathematical experience is not innate but is rooted in the concrete interactions between the body and the world.

3. Rural Outdoor Activities Promoting Children's Cognitive Development from an Embodied Cognition Perspective

3.1. Children's Agency and the Modern Reconstruction of Teacher-Child Relationships in Rural Outdoor Autonomous Play

Traditional cognition tends to neglect the role of the body in cognitive processes, whereas embodied cognition views the person as an integrated body-mind whole, emphasizing the agency and experiential nature of the subject in the cognitive process. It posits that children's cognition is not merely an information-processing activity inside the brain but the result of the interaction between the entire organism—the integrated body and psyche—and the environment. It emphasizes that children's cognitive activities always involve perceiving and understanding the world through the integrated body-mind. Children's cognition is built upon prior knowledge. Due to differing subjective experiences, cognitive structures vary significantly among individual children, potentially leading to different understandings and cognitions of the same object, thus forming unique cognitive structures. Therefore, children in the process of development are not passive recipients merely reacting to external environmental stimuli but active and proactive explorers. From an ontological perspective, children exist in the world through their bodies and actively construct their life-world through their bodies [4].

Rural outdoor activities unfold in environments rich and diverse in original natural resources. The unique natural and social resources of rural areas possess embodied characteristics. Natural resources are readily accessible and highly attractive to children, stimulating their curiosity and desire to explore, prompting them to actively choose materials of interest and gain experiences and knowledge through physical contact and manipulation. The rural outdoor natural space is the natural choice for rural kindergartens to conduct play, especially autonomous play. Autonomous play grants children autonomy and choice. Teachers create outdoor activities where children can engage in autonomous play. When provided with sufficient time, space, and play materials for autonomous exploration, higher levels of play behavior can be stimulated in children. Children independently select play materials and partners based on their own needs, interests, preferences, and characteristics, deciding where to play, what to play, with whom, and how to play. Through the process of autonomous play, they achieve the development of agency. The development of children's agency, in turn, benefits the development of self-awareness, interpersonal skills, independent thinking, creativity, and other abilities. Rural outdoor activities precisely capture the characteristics of rural children, better enhancing their cognitive abilities, allowing children to fully utilize their imagination and develop practical skills and creativity.

In outdoor activities, the teacher's role shifts from the traditional director of play to that of an observer and supporter. Firstly, in children's outdoor autonomous play, teachers are responsible for providing diverse play materials that stimulate imagination and creativity. These materials possess both openness and structure, emphasizing naturalness, originality, and integration with local rural characteristics. Secondly, rural preschool teachers support children's self-directed learning, effectively observing, analyzing, and understanding children's behaviors, posing targeted questions to scaffold children's thinking, offering constructive suggestions and timely, appropriate and necessary guidance, and adjusting educational strategies based on observations. In rural outdoor activities, teachers can more profoundly realize the transition from the traditional controller to the observer and supporter under modern educational principles, promoting the construction of a more equal and harmonious model of teacher-child relationship. This ensures adequate time and space for children's

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202512_8(12).0036

outdoor activities, creates a safe, supportive, and diverse outdoor environment, grants children the right to active learning, organically integrates children's spontaneous experiences with organized experiences, enhances their interest in exploring the world around them, effectively improves their problem-solving skills and social interaction techniques, ultimately achieving the goal of promoting cognitive development and even holistic development.

3.2. The Value of Rural Outdoor Educational Resources in Satisfying Children's Perceptual and Cognitive Development

A safe exploration environment is the prerequisite for ensuring the smooth conduct of this series of cognitive activities. Compared to urban environments filled with artificial stimuli, the tranquility and openness of rural nature reduce safety risks for children during exploration and allow them to engage with their environment more attentively and persistently. Simultaneously, the process of responding to minor challenges in a real environment (e.g., walking steadily along a ridge, coordinating the body to climb a small slope) is itself a form of problem-solving learning based on bodily feedback, which directly promotes the development of cognitive abilities such as motor planning and executive function.

On this basis, abundant natural resources provide indispensable sensory materials for children's cognitive construction. Traditional education often overemphasizes the imparting of abstract knowledge, leading to the long-term neglect of the foundational role of bodily perception in cognitive construction. Especially for children who are predominantly in the sensorimotor stage, a lack of embodied experience can deprive their cognitive development of vividness and practicality. Rural outdoor activities, with their inherent physical and mental participation, provide a broad field for remedying this deficiency. The original educational resources inherent in the natural environment possess strong physical operability, directly satisfying children's intrinsic need to understand the world through perception and action.

The rural outdoor environment constitutes an exploratory realm replete with multisensory stimuli. Soft soil, rough tree bark, stones of various shapes, flowing streams, and diverse plants and animals together constitute a vivid, three-dimensional educational environment. Children gain first-hand, multi-channel sensory experiences about the world through touching with their hands, observing with their eyes, listening with their ears, and even smelling scents. These direct sensory inputs are the raw materials for forming all complex cognition, providing the indispensable foundation for the brain to integrate, classify, and abstract information.

In this process, physical operability is the key bridge connecting perception and cognition. Piaget's genetic epistemology clearly states that cognitive development is rooted in the development of motor abilities. Rural outdoor activities allow children to engage in a large number of unstructured physical activities such as digging sand, stacking stones, climbing, chasing, and jumping. These activities are not only muscle exercises but also embodied explorations of the laws of the physical world. In play, children personally experience the causal relationships of gravity, balance, speed, and force, internalizing body schemas related to space, distance, and volume through countless trials and errors. This physically-grounded experience constructed through whole-hearted participation is considerably more profound and enduring than passively received knowledge transmission and serves as the cognitive cornerstone for their future formation of abstract logic and scientific concepts.

3.3. Deepening Cognitive Construction in Authentic Contexts and Through Emotional Drive

From the perspective of embodied cognition, cognition, body, and environment constitute an inseparable cyclic system. If divorced from specific contexts, cognition loses its accuracy and depth. Therefore, the value of rural outdoor activities lies not only in providing space for physical activity but also in creating authentic and emotionally meaningful learning situations

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202512_8(12).0036

that stimulate children's intrinsic motivation [5]. This positive emotional drive is a key factor prompting children to engage in deep cognitive exploration and construction.

Firstly, rural outdoor activities can effectively utilize local cultural and life resources, anchoring cognitive activities within an emotional background familiar to children. When outdoor activities revolve around traditional festivals, local cuisine, or folk stories, children perceive not only novelty but also a sense of intimacy and cultural identity stemming from life experiences. Positive emotional resonances such as curiosity, fondness, and pride greatly stimulate children's sustained desire to explore. For example, preparing traditional foods during a Hometown Food Festival allows children not only to experience culture but also, through this embodied practice, understand the physical changes of ingredients and the sequential steps of production in a real context, thereby transforming abstract cultural knowledge into operable body schemas and cognitive structures containing causal logic. Here, emotion serves as intrinsic motivation, guiding children to complete the deepening from perceptual to rational cognition.

Secondly, utilizing the unique natural environment of rural areas for exploration and observation can transform children's curiosity and wonder about nature into a direct driving force for scientific cognition. When children observe insects in the fields or perceive seasonal changes under trees, the emotional pleasure and awe evoked by the beauty of nature are the intrinsic motivations for their engaged and persistent observation and thinking. In exploration driven by such emotions, children become more meticulous and focused, thereby able to capture more environmental details, ask more questions, and attempt to establish connections between phenomena. This process significantly enhances the application of scientific cognitive skills such as observation, comparison, and induction, allowing cognitive construction to be efficiently accomplished within authentic emotional experiences and problem-solving.

Finally, through outdoor activities coordinated among home, kindergarten, and community, cognitive learning is embedded within a positive network of socio-emotional support. When family and community members participate, such as elders telling local stories or leading visits to local sites, children learn within a sense of security, belonging, and intimacy. This positive socio-emotional environment reduces the psychological pressure of cognitive activities, making children more daring to try, ask questions, and make mistakes. In interactions with different social members, children need to continuously engage in perspective-taking, communication, and coordination to achieve common goals, which is itself an exercise in complex social cognitive abilities. Therefore, socio-emotional support provides a safe "scaffolding" for higher-level cognitive activities, making cognitive construction smoother and deeper within social interactions.

4. Conclusion

Based on the concept of embodied cognition derived from Piaget's genetic epistemology, this paper analyzes the role of rural outdoor activities in promoting children's cognitive development. The analysis concludes that such activities foster cognitive development by respecting children's agency and reshaping teacher-child relationships, providing operable and perceptually rich educational resources that strengthen the sensorimotor foundation, and creating authentic socio-cultural and natural contexts that stimulate positive emotions and intrinsic motivation for deep learning. Therefore, rural outdoor activities, viewed through the lens of embodied cognition, offer an effective pathway for achieving high-quality development in rural preschool education.

Acknowledgements

The 2024 Inner Mongolia Postgraduate Research Innovation Project [KC2024079S].

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202512_8(12).0036

References

[1] Danish A J, Enyedy N, Saleh A, et al: Learning in embodied activity framework: a sociocultural framework for embodied cognition, International Journal of Computer-Supported Collaborative Learning, Vol.15(2020) No.2, p.49-87.

[2] Stoltz T, Weger U, Veiga D M: Consciousness and education: contributions by Piaget, Vygotsky and Steiner, Frontiers in Psychology, Vol.14 (2024) p.1411415.

[3] Goodwin C B: Genetic Epistemology and Constructionist Biology, Biological Theory, Vol.4(2009) No.2, p.115-124.

[4] Ingunn S, Eli M: How to support young children's interest development during exploratory natural science activities in outdoor environments, Teaching and Teacher Education, Vol.114(2022), p.114.

[5] Ferreira A I, Fornara F, Pinna V, et al: Autonomy as key to healthy psychological well-being: A systematic literature review on children's independent mobility, cognitive and socio-emotional development, Journal of Transport & Health, Vol.38(2024), p.101837.