



Cognitive Development and Environmental Consciousness in Children: An Analysis of Roopal Rashomani Kewalya's *The Little Rainmaker*

Bachan Kaur

PhD Scholar, Dept of English & Foreign Languages, Chaudhary Devi Lal University, Sirsa

Dr Umed Singh

Professor, Dept of English & Foreign Languages, Chaudhary Devi Lal University, Sirsa

Abstract: In the present era, where the world is facing severe environmental challenges, it's essential to understand how the young generation becomes aware of and responds to these challenges. The paper aims to argue that cognitive development plays a vital role in shaping children's thinking and understanding of the world around them. The analysis applies Piaget's and Vygotsky's cognitive development theories to examine the environmental consciousness among children by using the insights from the novel *The Little Rainmaker*. This novel is set in a dystopian world where resources are scarce, and the environment has deteriorated so much that there has been no rain for ten years. It serves as a backdrop to analyze the cognitive growth and ecological understanding of the 10-year-old protagonist, Anoushqa. By examining these theories, the study demonstrates that both nature and nurture are essential in developing environmental consciousness among children. Anoushqa's ability to understand and act on ecological threats is shaped by a combination of her natural cognitive abilities and the physical environment that surrounds her. Anu's understanding of the world comes not only from her biological growth but also from her social interactions with others and the cultural context in which she lives.

Keywords: Cognition, Environmental Consciousness, Cognitive Development Theory, Socio-cultural Theory, Nature and Nurture, etc.

Child development is a complex process that involves various domains of development, such as physical, cognitive, social, emotional, and moral. Each of these areas plays a vital role in the overall development and well-being of the child. Cognitive development is at the centre as it affects and is being affected by other areas of development. In her book *Child Development*, Laura E. Berk defines “cognition” as the mental activities and outcomes that help one understand and learn about the world. It involves various mental skills, such as thinking, remembering, reasoning, planning, problem-solving, creating, and fantasizing (225). Cognitive development often takes centre stage in any meaningful discussions about developmental psychology. Two of the most influential theories that have shaped the understanding of this process are Jean Piaget’s Cognitive Development Theory and Lev Vygotsky’s Sociocultural Theory. Both theories offer valuable insights into how children learn and develop, yet their perspectives differ regarding the role of nature (biology/maturation) and nurture (environment).

Piaget’s theory is grounded more in a biological perspective, emphasizing the stages of individual cognitive maturation. On the contrary, Vygotsky’s theory focuses on sociocultural context, highlighting the importance of social interaction and cultural tools in cognitive development. In the article “Piaget’s 4 Stages of Cognitive Development Explained,” Kendra Cherry defines the same while saying Piaget felt that development is primarily fueled from within, while Vygotsky believed that external factors like culture and people, including parents, caregivers, peers, etc., play a more significant role. Piaget believes that children need to reach a certain level of maturity before learning new things or developing new skills. However, Vygotsky believes that while some cognitive tasks require a certain level of maturity, development isn’t entirely dependent on it. He argues that cognitive development can happen earlier if the child is in the right environment. Both theorists agree that children are not passive recipients of knowledge; instead, they actively construct their understanding of the world through interaction with their environment. While Piaget emphasizes the individual’s exploration and discovery, Vygotsky focuses more on the role of social interaction. Piaget proposes that cognitive development occurs in four universal stages. He believes that all children, regardless of culture, progress through these stages in the same order, though the pace may vary. Vygotsky, in contrast, argues that cognitive development is continuous and varies significantly across cultures. Saul McLeod, in the article “Piaget’s Theory and Stages of Cognitive Development,” also claims that Piaget proposed a stage-based model of cognitive development, while Vygotsky viewed development as a continuous process influenced by social and cultural factors.

The present paper draws on both theories to thoroughly analyze the cognitive development of the child protagonist of the novel *The Little Rainmaker*. It depicts the experiences and observations of a 10-year-old girl, Anoushqa Narang, in a dystopian world where it hasn’t rained for a decade.

Cognitive development plays a vital role in shaping a child's awareness of environmental issues. As children's cognitive skills develop, they become more capable of understanding and addressing all problems, including ecological challenges. By applying the theories of Piaget and Vygotsky, respectively, the paper explores how nature and nurture equally play a vital role in Anoushqa's learning about the environment and the ecological problems confronting her and how a sense of awareness and advocacy develops in her with an interplay between the two.

Firstly, Anoushqa's actions and thoughts in the novel are analyzed using Piaget's Cognitive Development theory. Swiss radical constructivist Jean Piaget believes that children do experiments, make observations and learn from their surroundings. According to him, a child's understanding of the world is formed through schemes, the basic building blocks of cognitive development. Piaget's four stages of cognitive development provide a framework for understanding how children's thinking and reasoning evolve as they grow. Each stage is marked by different ways of thinking and understanding the world around them. These stages are termed sensorimotor (0 to 2), preoperational (2 to 7), concrete operational (7 to 11), and formal operational (11 and older). The present paper focuses specifically on the concrete and formal operational stages because children around 10, like Anoushqa, are in a transition phase of the development of cognition. At this age, they can show traits of both stages. *Scholars Journal of Applied Medical Science* describes various features of concrete and formal operational stages. Children develop logical and inductive reasoning during the concrete operational stage and understand conservation, classification, seriation, reversibility, and decentration. They grasp cause-and-effect relationships, think more logically and flexibly, and consider others' perspectives, though they still struggle with abstract thinking. In the formal operational stage, children foster abstract, systematic, and scientific thinking, along with deductive reasoning and hypothetical reasoning. They can predict outcomes, solve problems logically and step-by-step, and explore alternatives beyond the present reality (2155).

The Concrete operational stage allows children to understand and organize concrete information about the real world. Anoushqa understands how water is managed globally in this water-scarce world. She is aware of the global struggle over water as she says, "Countries worldwide are fighting over water. First, they capture water. Then they spend billions of dollars cleaning that water. And then they spend billions more to transport it to different parts of the world" (Kewalya viii). However, her knowledge of synthetic water (H₂O) and its rationing represents the formal operational stage, where she engages with more abstract and hypothetical concepts. She is aware of the water crisis and thinks about the future of water scarcity and its implications for the entire race of humanity. Anoushqa's thoughts about rain, the extinction of dinosaurs, and the possibility of human extinction show her ability to think about abstract concepts. Her question about what might happen in future and who would tell human history if people became extinct demonstrates her ability to think about hypothetical situations and their potential threats and outcomes.

Anoushqa describes the steps she must take to protect herself from the harsh environment, such as applying lotion and wearing protective clothes and dark glasses. This shows her ability to follow logical steps and understand practical measures to stay safe. When Anoushqa says everyone knows it's a fact of life, it shows her acceptance of the necessary precautions as part of her daily routine. This demonstrates her ability to think practically about her environment and adapt her behaviour based on real-life knowledge, which is typical of the concrete operational stage. She also explains how Pixie, her dog, died because it didn't wear a protective jacket on a hot day. Anoushqa understands that the excessive heat and dry air caused the death of Pixie. This demonstrates her ability to understand cause and effect relationships. After hearing her Grampa's wish, Anoushqa vows to make it rain. Although she doesn't know how to achieve this, she is determined to find a way. Anu's determination reminds one of Matilda, the young protagonist in Roald Dahl's *Matilda*, who is equally determined to overcome the troubles in her life. Both characters possess intellectual abilities far beyond their age, enabling them to understand and tackle the challenges they face. Thinking about the explorer Christopher Columbus, who must have faced the same problem as Anoushqa is facing, she decides, "Well, Columbus must have started somewhere. And so should I" (35). This indicates her ability to plan for the future and think about possibilities that aren't clear yet. She is not just thinking about immediate concrete actions but is ready to take a journey that promises both uncertainty and creativity.

Anoushqa's skepticism about whether her grandfather's stories are true shows her ability to use logical reasoning. She doubts his descriptions of a time when water was abundant and people could play outside freely. Anu says, "I can't believe that there was a time when the taps in our homes actually had water coming out of them. Now that would be a sheer luxury. You know what else would be a luxury? To play outside in uncovered gardens" (xiii). This indicates her capacity to evaluate information critically in the light of evidence. She differentiates between her grandfather's stories and her own experiences. Anoushqa's ability to plan and execute her scheme to meet the scientist Gargi reveals several dimensions of her cognitive development. She anticipates her mother's likely objections and her father's skepticism, which shows her ability to imagine and negotiate different perspectives. Additionally, Anoushqa's way of justifying her lie by saying that sometimes parents force you to lie reflects her moral reasoning. Her trick of hiding the sick leave application among already signed papers reveals Piaget's concept of reversibility.

Anoushqa accepts Ratul's father's proposal to raise Grandfather's Memorial in his HD Mall. At this, Anu's father gets disturbed because he thinks that people like Ratul's father and the magician are using her daughter's dreams and emotions for their benefit. In frustration, he tells Anoushqa that she should not have created the social media page. At this, Anoushqa confronts her father, saying, "You said I should have asked before creating the social media page. Did you people ask any of us ten-year-olds when you were busy wrecking the environment so it would not rain for ten years? No, you did not!" (160). Her ability to question and critique adults' actions and speculate about the future demonstrates her use of hypothetical reasoning. She raises ethical questions about responsibility and

justice, such as why adults didn't prevent environmental damage and why they didn't ask children before doing this all. This kind of reasoning, where she thinks about fairness and accountability, is a sign of advanced cognitive abilities in the formal operational stage. Anu's concerns echo Greta Thunberg's reflections in her book *No One Is Too Small To Make A Difference*. Both voices critique the short-sightedness of previous generations and urge readers to rethink their responsibility towards the planet and future generations. Anoushqa's arguments and emotional responses show her capacity for abstract thinking. She focuses on what's happening right now and thinks about what might happen if things continue like this. When her father talks about fighting with Ratul's father, who is trying to manipulate her daughter, Anoushqa responds, "You should have fought then, Dad. Not Now. Because now it's too late. It may never rain again...ever. And Grampa might not see rain again...ever..." (161).

Secondly, Vygotsky's theory is applied to reflect how Anoushqa's thinking and cognitive abilities are influenced and affected mainly by the social and cultural context in which she lives. Vygotsky, a social constructivist, emphasizes the importance of social interaction and the role of more knowledgeable others in a child's cognitive development. In the article "Vygotsky's Theory of Cognitive Development," McLeod defines Cognitive development as a socially mediated process by which children acquire cultural values, beliefs, and problem-solving strategies through collaborative dialogues with more knowledgeable members of society. According to Vygotsky, the social surroundings in which a child grows up greatly influence their learning. In his Sociocultural Theory of Cognitive Development, Vygotsky provides various learning concepts. The concept of the Zone of Proximal Development (ZPD) is a key element of this theory. It is an important idea that shows the difference between what children can do alone and what they can do with the help from someone more skilled. Kruthi Pedapati, in a journal article, "Piagetian and Vygotskian Concepts of Cognitive Development: A Review," explains ZPD as the distance between the child's actual development and the potential/competence (231). The ideas of a More Knowledgeable Other (MKO) and Scaffolding are crucial for understanding ZPD. The MKO is anyone with a higher level of knowledge and skill than the learner and can provide the necessary guidance and support.

Scaffolding is a temporary support given to the child to help them complete a task they can't do alone but can accomplish with guidance.

Grampa's role exemplifies Vygotsky's theory that cognitive development is deeply rooted in social interactions with knowledgeable others. Through life lessons, rules, and storytelling, Grampa helps Anu navigate her world and develop cognitive skills. He instils values of sustainability and resourcefulness in Anoushqa as he teaches her the value of fixing things instead of replacing them. Through the story of the rabbit and the rule that what has to happen will happen, Grampa teaches Anoushqa to focus on what needs to be done despite uncertainties. This practical wisdom helps her understand the importance of proactive behaviour, reflecting Vygotsky's idea that learning is a socially mediated process. When Anu struggles with a question, Grampa's advice to change the question fosters cognitive flexibility, a key aspect of problem-solving. This guidance helps her to seek experts to make it rain, reflecting the concept of ZPD. Grampa teaches Anu to defy limitations

imposed by others, as no one can tell her that she can't do what she wants to do. He says, "Don't let the prime minister and anyone else tell you that you can't achieve your dream. You must do what you have to do....And what is the point of a boat that never sails? Sail away, my butterfly..." (127). This encourages her to seek solutions and believe in her abilities.

Grampa plays a crucial role in Anoushqa's cognitive development by providing her with scientific facts and explanations. In their interaction about the pet dog Pixie's grave, Grampa provides her with scientific knowledge about decomposition. He explains that humidity in the soil is essential for a dead body to decompose into a skeleton. Grampa also tells her about the dwindling numbers of lions and sparrows that have disappeared because no one cared for them. He teaches her that every creature, regardless of size, plays an important role in the ecosystem: "We are all part of an ecosystem, one that needs to be balanced. Small needs big, and big needs small....And if we don't look after our butterflies, we'll lose them, and do you know what will happen then? We might as well lose ourselves too" (82). Grampa also mentions that Nature is the biggest equalizer. He elaborates that humans were more connected to nature and each other in the past, but over time, this connection has been lost owing to the mechanisation and automation of human life. Now, nature is reminding everyone of its importance by showing its power and influence. This serves as a reminder of how critical it is to maintain harmony with the non-human world. His explanations help Anoushqa grasp complex ecological concepts in a way she can relate to and understand.

The scientist Gargi's conversation with Anoushqa reflects Vygotsky's concept of ZPD, where Gargi's explanations scaffold Anoushqa's understanding. Initially, Anoushqa feels disappointed and confused when Gargi explains the difficulties in getting permission to use the rain-making technology. She explains the complexities of government permissions and international agreements: "Well, to be honest, it's not the prime minister who refused. It's the United Water Front, the international organization that controls the water situation of the world" (120). This helps Anoushqa understand the complex processes she wouldn't have grasped alone. Anoushqa is upset and confused as to why the PM and the international organization, the United Water Front (UWF), would turn down the opportunity to make rain. At this, Gargi explains the complexities of global politics and the challenges faced by world leaders. As a knowledgeable adult, Gargi helps Anoushqa understand how the world works. She explains that allowing only some countries to make rain could create an imbalance of power. It can lead to potential conflicts over water resources. She also mentions the possibility of floods and climate warfare by saying, "...Countries that possess a rainmaking formula can overpower their neighbouring countries by simply making it rain, wiping them out with floods, and seek to control them" (121).

Anoushqa reflects on her father's warnings about the future conflicts over water and the unreliability of online information. He plays a crucial role in shaping her critical thinking skills by encouraging her to question and verify information. Anu's father is very upset by the recurring incidents of dehydration caused by faulty humidifiers. His reaction serves as a social context through which Anoushqa learns about complex public health issues and governmental responsibilities: "This is the fifth such case in two months. What is the government doing? What kind of air we are giving

to our children?” (5). This concern helps Anoushqa understand the broader societal and environmental context in which they live. Anoushqa’s father’s criticism of the construction of HD Mall significantly influences her perspective. Initially, she is excited about the new mall, imagining its fun activities. She feels happy about swimming and enjoying a humidified environment without masks and capes. But her father’s strong disapproval changes her perspective. He expresses frustration about the environmental cost and waste of resources. Her father’s comments provide Anoushqa with a new framework for understanding the ecological implications of the mall. When Anu says that her classmate Ratul’s father is building that mall, he tells her, “... You must tell him that the cost of humidifying such a big place would be insane! And a swimming pool or real water on the terrace? Is he crazy? That much water can save a small nation!” (44). As a result, when Anoushqa confronts Ratul, she repeats her father’s concerns. She questions and evaluates the ecological cost and resource consumption, reflecting her internalization of her father’s values and viewpoint. Anu’s ethical awareness is similar to Binya’s in *The Blue Umbrella* by Ruskin Bond. She realizes that showing off her umbrella is causing unrest in the village. Despite the joy it gave her, she understands its impact on social harmony. So, she chooses to give it away, showing her growing moral responsibility.

In vygotsky’s sociocultural theory, collaborative learning, reciprocal teaching, and peer interaction are essential for developing cognitive abilities. For instance, the science teacher, T-Rex, engages students in hands-on activities to teach complex scientific ideas, such as the volcano eruption experiment and the rain simulation in a jar. She announces, “... We will just make it rain in a glass. Nothing too elaborate, but at least it will be a starting point for you to understand how rain used to fall on Earth before you were all born” (107). By actively involving students in experiments and explaining concepts like condensation, mist, hot air, etc., she allows them to learn through direct experience. At one point in the novel, Anoushqa is confused when her friend Maurice tells her that Gargi might be using her name for her selfish gains. Maurice explains to her that Gargi could be using the social media page to become famous rather than genuinely interested in causing rain.

Anoushqa’s response shows her innocence and single-minded goal of making it rain for her grandfather. Her perspective is broadened by Maurice, who helps her see that others might have different reasons for their actions.

In Vygotsky’s theory, cultural tools, such as language, media, and technology, are crucial in shaping a child’s cognitive development. When Anu goes to meet the magician without informing anyone, she starts having second thoughts. Her thoughts and fears are shaped by the crime shows she watches on TV. When Anoushqa worries about the dangers of meeting a stranger or being in an unknown place, she reflects on the information she has absorbed from these shows. The news reports that she gets through the media about global issues are not just passive information; they actively shape her worldview. The news anchor reports, “Scientists discovered water on Mars in 2015, exactly thirteen years ago. If rain continues to evade us much longer, the next world war could well be fought over water in space” (1). This makes her more aware of the broader context in

which she lives. When Anoushqa hears on TV about the controversy surrounding the construction of the HumiDome Mall, she grasps the severity of environmental issues and their global implications. Moreover, recognising her efforts to make rain through a global news channel validates her actions and reinforces her sense of agency.

To sum up, the paper highlights that developing environmental consciousness in children involves both cognitive growth and the impact of their socio-cultural milieu. Piaget's theory provides a framework for understanding Anoushqa's progression in concrete and formal operational thinking. Her concrete actions and logical reasoning reflect the developmental stages where children begin to apply cognitive skills to real-world problems. Her ability to think abstractly about future consequences and engage in problem-solving exemplifies how cognitive maturity facilitates an understanding of ecological challenges. Conversely, Vygotsky's theory emphasizes the role of social interaction and cultural context in cognitive development. Anoushqa's interactions with key figures such as Gargi, her father, Grampa, etc., illustrate how external influences shape her understanding of environmental issues. Integrating Piaget's and Vygotsky's theories reveals that a child's environmental consciousness emerges from a dynamic interplay between biological maturation and sociocultural contexts. Anoushqa's journey highlights that while cognitive abilities enable children to grasp complex ecological concepts, support and guidance from their social environment are crucial in shaping their understanding and responses.

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