8

From Gurukuls to Green Classrooms: Nature-Based Learning in Ancient Indian Educational Traditions and its Relevance for Sustainable Education under NEP 2020

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1. ABSTRACT

Academic interest in models of education that support the development of responsibility for humans in relation to nature is once again alive in the twenty-first century because of the challenges that nature poses to humans.Educational models that promote the development of a responsible attitude towards nature are once again a subject of academic interest in the twenty-first century due to the challenges that nature poses to humanity. In this paper, the nature-based learning approaches of ancient Indian education systems are revisited and it is concluded that these approaches are relevant to sustainable education as envisioned in the National Education Policy (NEP) 2020. The study takes a conceptual and descriptive approach and uses Vedic and Upanishadic texts, classical texts of ancient Indian education, and more recent research on eco-pedagogies and the Indian Knowledge System (IKS). It demonstrates the functioning of the forest-goal based Gurukul (Tapovana) as an immersive learning area through which ecological sensitivity, along with ethical maturity, was nurtured through observing, performing, working on the land and living together as a community. These traditions are distilled into six eco-pedagogical principles; learning by direct experience, interconnectedness of life, environmental stewardship, simplicity and sustainable living, holistic development and respect for biodiversity. These principles are mapped on NEP 2020 priorities like experiential learning, environmental education, integration of IKS, etc. and implications of these for teacher educators are considered. In this it concludes that the sustainable and holistic education India is aspiring to build today has a culturally rooted base in the ancient Indian eco-pedagogy.

Keywords: Indian Knowledge Systems, Gurukul, Nature-Based Learning, Eco-Pedagogy, Sustainability Education, NEP 2020

2. INTRODUCTION

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2.1 Environmental Challenges in the Twenty-First Century

Learners are inheriting a situation that is arguably more dire than has ever before existed. Average global temperatures continue to climb, weather extremes have grown more frequent and more violent, and the window for limiting warming to manageable levels is narrowing with every passing decade (IPCC, 2023). A parallel, although not immediately threatening, crisis of biodiversity exists alongside the climate emergency: species are disappearing at unprecedented rates, and the ecosystems on which food, water and health depend are under threat of degradation and loss at a faster rate than their resilience (IPBES, 2019). They are not distinct issues but instead indicators of one underlying issue i,e, a human system of activity that views the natural world as a source of resources rather than a living system that human life is a part of.

The impact of this crisis, in addition, is not evenly distributed and is the farthest-reaching. The young that are in the classrooms today, will feel the consequences of the events that occurred long before they were able to vote or exercise their right to remain silent.Those young people in classrooms today will be affected by consequences resulting from events that happened before they were able to vote or exercise their right to remain silent. This situation is aggravated by the fact that it is, at its core, a crisis of relationship and of values, one that is education's issue. Technological solutions to a problem derive from the human perception of their place in nature. Where education has influenced attitudes that have caused ecological damage, it can be influential in changing these attitudes. The recognition has brought environmental issues from the periphery of the schools to the focus of debates about the purpose of learning.

2.2 The Need for Sustainable Education

Sustainable education (in a broad sense) aims to provide students with the knowledge, skills, values and dispositions needed to create a more just and ecologically sustainable future. This is reflected at the global level in Sustainable Development Goal 4.7, which asks to ensure that education systems teach all learners how to promote sustainable development and sustainable lifestyles (UNESCO, 2017). However, sustainability cannot be presented as something that is learned as a topic for memorization. It seeks to make a change in direction, moving away from the passive transmission of information and toward learning that has a connection to the real world; one that involves the hands in the learning process; one that includes ethical responsibility as part of what's learned, not as extra. But the question arises, how might learners come to feel themselves as a part of their environment?

2.3 The Emergence of Eco-Pedagogy

Eco-pedagogy is one influential answer to this question that is rooted in critical pedagogy and the environmental movement. Later, other educators asserted that the true goal of learning is to gain the capacity to read and react to the patterns of the living world, which they termed ecological literacy (Orr, 1992), building on Freire's claim that "Education is never neutral, it is either domesticating or liberating" (Freire, 1970). Moacir Gadotti further developed Freire's thinking towards planetary citizenship by defining education as "care for the Earth as a shared home" (2010) and Richard Kahn provided a definition of eco-pedagogy as "a movement that connects social justice with the flourishing of all life" (2010). These contributions share a fundamental belief, one that is explicit in systems thinking, that life is patterned more like a web

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of interdependent parts than a collection of separate parts (Capra, 1996). Eco-pedagogy values connection, experience, and responsibility which are the attributes of a sustainable future.

2.4 The Importance of Indian Knowledge Systems

Although the concept of eco-pedagogy has been expressed in many western academic languages, such an orientation is not novel. Indian Knowledge System (IKS) is a vast accumulation of philosophy, science, art and practice over several millennia in the Indian subcontinent and passed on from generations to generations in both formal and informal way (Mishra, 2018). Much of this knowledge was transmitted orally rather than in books, and for a long time it was overlooked by formal educational institutions that were influenced by the colonial mode of instruction. An important aspect of this tradition is its holistic perspective on human life and society, where the individual is seen not as being separate from society or nature, but as an integral component of a unified moral and cosmic framework. This holistic approach resulted in a rich tradition of traditional ecological knowledge, including agriculture, water management, herbal medicine, and seasonal observations rooted in sustainable living practices with the local environment over long periods of time (Kumar, 2016). Much of this heritage can be read through the lens of contemporary, sustainability science concerns. This resonance is what makes IKS a useful tool for reimagining EE and it is through this that NEP 2020 also seeks to bring resources into mainstream curricula, to recover them.

2.5 Rationale of the Study

It is the central argument of this paper that ancient Indian education did not regard "play in nature" as a pleasant setting and background for learning, but rather "play in nature" itself was the very medium of learning. The Gurukul, particularly the forest Gurukul, was a place where learning took place in the presence of trees, rivers, animals and the cycles of the agricultural year. The Gurukul is a proven model to explore when considering how to make today's schools “green classrooms” in which children learn from, and with, the living world. This research is then guided by two rationales. First, it aims to restore this traditional pedagogy that created ecological consciousness, technical skill and moral responsibility within these ancient spaces. Secondly, it asks what these rational principles would be expressed in the goals of sustainable education postulated in NEP 2020, thus enabling an inheritance that is often viewed as a mere historical artifact to be used to solve a current crisis.

2.6 Objectives of the Study

The study proposes following objectives:

- To explore the nature-based learning practices embedded in ancient Indian educational traditions.
- To examine the relevance of nature-based learning for sustainable education.
- To identify the eco-pedagogical principles inherent in the Gurukul system.

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- To analyse the relevance of these eco-pedagogical principles for contemporary education under NEP 2020.

3. METHODOLOGY

This study is conceptual and descriptive in nature. It is not an analysis of new empirical data, but rather an interpretation and synthesis of a range of textual and scholarly material to draw a conclusion about continuity between past and present educational ideals. This approach is suitable because the subject, philosophy and practice of nature based learning is suited to careful reading of sources rather than measurement.

The study is based on three general types of sources. The first contains both primary and classical texts such as hymns from the Vedas, especially the Atharvaveda, and selected Upanishads which contain early Indian thoughts on nature and man's role in it. The second contains classical and modern writings on ancient Indian education with particular reference to the fundamental scholarship of Altekar (1965) and Mookerji (1947) that reconstruct the organisation and ethos of the Gurukul. The third is modern literature on ‘Eco-pedagogy', ‘Education for Sustainable Development' and ‘Indian Knowledge System' along with the text of the ‘National Education Policy 2020' (Ministry of Education, 2020).

Thematics analysis method is used. Carefully reading the literature, ideas about the relationship between learning and the natural environment were identified that were common across different sources. These ideas were then organised into meaningful themes, distilled, and organized into a set of principles that became the nature of eco-pedagogy. Finally, each principle was checked for its correspondence with the objective of NEP 2020 and the analysis shifted from a description of the past to a discussion about the present.

4. NATURE IN ANCIENT INDIAN EDUCATIONAL THOUGHT

4.1 The Concept of Nature in Indian Philosophy

In the classical Indian perspective, nature is not something that stands in opposition to a human subject, but is a form of the same Reality that is present in all beings. The idea of the one underlying the many that is present in the entire Vedic and Upanishadic wisdom is that the distinction between self and environment is at the deepest level permeable. The Isha Upanishad begins with the powerful affirmation that the entire universe is infested with the Divine, and recommends that humans should take what the world provides them, with moderation and without clinging to it. From this premise comes a principle of moderation: Nature is sacred, shared and may be used but not plundered. This orientation provided Indian educational thought with a beginning that was very different from that which assumed that nature is for the sake of being conquered.

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4.2 The Panchamahabhutas

The doctrine of the Panchamahabhutas (the five great elements) of Earth (prithvi), Water (apas), Fire (agni), Air (vayu), and Space/Ether (akasha) is a concrete way of expressing this integrated worldview. Within this system, all matter, including human organs and body, is made up of these five elements in different proportions. The doctrine is certainly ecological in its implication: Human beings are not made of a special substance that differentiates them from the other elements of creation, but they are continuous with the soil and rivers and air that surround them. Therefore it is literally to injure the elements and to injure oneself. A student trained in this awareness would not have been taught the abstract moral imperative to be green, but rather to realize that he was physically connected to the rest of the world.

4.3 The Human–Nature Relationship

This tradition expresses the relationship between human beings and nature more commonly as a kinship rather than ownership. In the well-known statement that the Earth is the mother and the human being is her son (Atharvaveda 12.1.12), the celebrated Atharvaveda hymn to the Earth – the Bhumi Sukta or Prithvi Sukta – describes the Earth as the mother and the human being as her child. The same hymn makes an extraordinary request for moderation: may whatever is dug from the earth grow quickly again, and may not her parts be wounded; (Atharvaveda 12.1.35) In essence, the conservation of use: use what is required, leave it to regenerate and do not cause permanent damage. The humanization of nature rather than the commodification of nature influenced the emotional texture of education, fostering a sense of gratitude and awe.

4.4 Ecological Wisdom in Vedic Literature

Attention to the natural order is spread throughout the Vedic literature, beyond the framework of any one hymn. River, dawn, the seasons, plants and animals are mentioned over and over again not as a background scene but as forces to be dealt with and respected. The herbal hymns that describe plants according to their healing properties suggest that a prudent, observational understanding of local plant life had developed which would contribute to the Ayurvedic tradition (Prime 2002). The body of thought views nature's components as actors in a moral landscape which is maintained through truth and appropriate action and practices, for which ecological balance and moral behavior are considered intertwined (Chapple & Tucker, 2000). In brief, the Vedic seers did not divorce the knowledge of the world from the worship of the world; and this continuity was a feature of the educational ideal that developed out of the Vedic texts. It is also significant that this was not a sentimental attachment but practical, the knowledge of a plant's healing properties, when the monsoon comes, or the behavior of a river, was useful knowledge and a form of respect. The tradition thus rejected the modern dichotomy of objective study and ethical consideration, and affirmed that to learn the natural world rightly was already to be subject to it.

4.5 Learning through the Natural Environment

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Given such a worldview, it was natural that the environment itself should become the principal site and instrument of learning. While the forest hermitage was not so much the choice of a suitable dwelling as it was the alternative that direct access to nature could produce discipline for the senses, calm for the mind, and truths that a schoolroom of the house could provide. Observing the discipline of the seasons, the interdependence of species, and the consequences of one's own actions on the land was understood to form character as much as it imparted information. In this sense, ancient Indian thought already grasped a principle that modern educators are rediscovering: that the natural world is not merely a subject to be studied but a teacher in its own right (Dwivedi, 2000).

5. GURUKULS AS NATURE-BASED LEARNING SPACES

If the philosophical foundation of ancient Indian education was an integrated vision of humanity and nature, the Gurukul was the institution that translated that vision into daily practice. Reconstructions of the system by Altekar (1965) and Mookerji (1947) describe a residential community gathered around a teacher, in which living and learning were inseparable and in which the surrounding environment was woven into every aspect of the student's formation

5.1 Location of Gurukuls in Forests (Tapovanas)

The location of the Gurukul in the forest was not an incidental of nature, but a conscious decision made in the process of planning the education.The siting of the Gurukul in the forest was not accidental, but a conscious decision in planning the education. Tapovana literally means a grove dedicated to tapas or disciplined effort, and it was located at a distance from the hustle and bustle of town and trade, where the rhythms of study could be synchronized with the rhythms of nature (Altekar, 1965; Mookerji, 1947). This relationship between learning and the forest is documented in the very name of the Aranyakas which is the name of the texts composed and meditated on in the forest. The Upanishadic conversations have left traces of such hermitages as a centre of philosophical discussion where teacher and pupil discussed together in the company of trees and running water and did not have a wall around them. The distance of the world, known to calm the senses and focus the mind, and the forest was appreciated not for its beauty but for its ability to foster a state of serious thought. The tradition reinforced the choice of the grove over the marketplace, which was a statement of the virtues of restraint and reflection, and for the education they demanded to see those very traits.

5.2 Learning through Observation

In this context there was a shift toward observation as a major means of knowledge. There was no rigid canon of texts in the Gurukul curriculum; it spread beyond the pages of the books to the world of nature, the course of the stars, animal behaviour and plant characteristics, all of which were studied first-hand. The night sky was used to learn astronomy, herbs for medicine by collecting them and using them and the behaviour of rivers and weather by having long familiarity with a particular place. It is a form of patient listening, which is a key aspect of the

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difference between lower and higher knowledge, as described in the Mundaka Upanishad (1.2.12): "Lower knowledge is honoured and higher knowledge is known." Observation in the Gurukul was then no passive looking but an education in reading the consequence and the connection of the natural order, so learning principles which could not be emphasized by recitation alone (Mookerji, 1947).

5.3 Experiential Learning Practices

The Gurukul not only taught but it also showed what was learned. The student learned by doing: through recitation, resulting in internalisation of the texts; through the performance of the rituals described by the texts; through challenging questions, testing the understanding of texts; and through the practice of work/craft and skills of everyday life, involving apprenticeship (Altekar, 1965; Mookerji, 1947). Once more the tradition refers to anubhava; learning that is owned, as lived, not heard. As much as possible, instruction and application were coupled together—the key pupil learning materials in the morning were usually the action the pupil was required to perform in the afternoon. The outcome was an education that went hand-in-hand with both knowledge and skill, and one in which the natural world was always the backdrop for and the test of all that was taught.

5.4 Agriculture and Daily-Life Activities

The economy of the hermitage was very practical and agrarian labour became a part of the student's training as well as domestic labour. Cultivation of crops, tending cattle, and collecting firewood and water, attending the cow, tending the sacred fire, and caring for the upkeep of the ashram were all shares done by pupils; in many communities the practice of taking alms (bhiksha) on a daily basis was a form of discipline in humility and dependence on others. In such activities they gained familiarity with cultivation, irrigation and animal husbandry, which were to be later codified in treatises like the Vrikshayurveda, and formalized knowledge of the statecraft in the formal writings of Kautilya's Arthashastra. But this was no hindrance to study, but a source of pride, and a lesson on the patience required during the agricultural year; it was also a first-hand experience of the process of obtaining food from the bark of the trees and the roots of the ground. The student who got himself sown, watered and harvested—learned things first hand that the land was generous—he had received as much as he could take!

5.5 Community Living and Environmental Ethics

The Gurukul was at the same time, more than just a school, as a community life shared by everyone and an unstated moral education imparted. Being dependent on one another and the environment developed cooperation, responsibility and restraint without being taught them and made them routines for the students, the instructor and the environment. The attitude towards life in this is a doctrine of moderation and non-grasping which is brilliantly summarized in the Isha Upanishad's opening counsel, offering an economy of language that depth of meaning that it has no need for world-omnipresent god is one who should be enjoyed through the act of renouncing, never desired by anyone's riches. Atharvaveda 12.1.12, the Hymn for the Earth, is similarly

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mandated by the same temper in the Atharvaveda: to address the Earth as a mother worshipping body (Atharvaveda 12.1.35), and to ask that the body not be hurt and that such taking be given to grow back. Some such scriptures have been read as evidence that in this tradition, the concept of ecological balance and the concept of ethical living are related aspects of a single moral order (Chapple & Tucker, 2000). Sharing, conserving and caring were the ways in which the Gurukul represented an intangible devotion to nature into tangible structured activities.

5.6 Holistic Development through Interaction with Nature

In everything in this arrangement, the ultimate goal was not to convey information or give an overview of a series of facts, but to create the whole person. The tradition's model of holistic development is reflected in the Taittiriya Upanishad description of the five sheaths or panchakosha which portray the human being as a whole entity made up of physical, vital, mental, intellectual and spiritual dimension. All these were solved one by one or together, in the education-received in the Gurukul: the body was disciplined by work and routine, the senses and the emotions were calmed by living in Nature, the intellect sharpened by study and discussion and the spirit matured through contemplation and moral practice. The bond that held this together was a continuous engagement with the nature of things, linking body and technique with moral endeavor and mental discipline to an affective relation with life. A Gurukul shaped learners who are capable, knowledgeable, and of good character – in other words, an ideal education that focuses on shaping character. It demands that the environment within which a person was raised be the very place where this character is created.

Table 1. Nature-Based Learning Practices in the Gurukul Tradition

Practice in Gurukul	Primary Source	Educational Principle	Modern Example
Forest setting (Tapovana)	Atharvaveda 12.1	Learning through direct contact with the natural environment	Outdoor classrooms; nature-based field learning
Observation of flora and fauna	Atharvaveda 12.1; Rigveda 10.97	Scientific observation as a mode of knowledge	Nature journaling; biology fieldwork
Agricultural labour and cultivation	Vrikshayurveda (Surapala); Arthashastra (Kautilya)	Productive work as a form of learning	School gardens; farm-to-table projects

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Srauta and daily fire rituals outdoors	Taittiriya Up. (Shiksha Valli 1.1); Rigveda	Reverence for natural elements as ethical practice	Eco-rituals; environmental pledge assemblies
Community living and shared labour (seva)	Mookerji (1947); Altekar (1965)	Cooperative responsibility for shared resources	Eco-clubs; collaborative conservation projects
Brahmacharya: disciplined, simple living	Manusmriti 2.20–2.24; Altekar (1965)	Simplicity and restraint as sustainability values	Minimal-waste school routines; mindful consumption
Study of Ayurveda and healing plants	Rigveda 10.97; Charaka Samhita	Biodiversity as practical and sacred resource	Medicinal plant gardens; ethnobotany activities
Oral transmission in forest settings	Aranyakas; Mundaka Up. 1.2.12	Environmental context as mnemonic and meaning-maker	Story walks; outdoor storytelling and recitation

6. ECO-PEDAGOGICAL PRINCIPLES EMERGING FROM INDIAN KNOWLEDGE TRADITIONS

An analysis of the practices described above allows for a "thematic reading" that shows that they are based on a coherent set of pedagogical principles related to the environment. These values have not explicitly been codified as a theory, but lie embedded in the way learning is organised within the Gurukul and will only have meaning when developing a theory from reading its practices through the lens of questions posed by modern-day eco-pedagogy. What is striking is the close similarity with the commitments of that modern movement, so closely in fact that an inheritance narrowly thought to be a piece of history can be construed as basically a philosophy of ecological education, though not a systematic one.

Theme 1: Learning by Direct Experience

The first and most pervasive is that real knowledge is gained by first-hand experience rather than by second-hand teaching. In the Gurukul, teaching is done through observation, fieldwork and applied practice and represents the belief that knowledge is best retained by an experience, the experience that the tradition calls anubhava. This conviction that knowledge is constructed through direct experience is the same one that underlies modern experiential learning theory

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(Kolb, 1984), and it is this that drives both experiential and inquiry-based teaching today, and it's a message that David Orr would offer as this is how one can only gain an appreciation of ecological literacy, "by prolonged engagement with the living world" (Orr, 1994). The forest classroom and the modern field study are based on the same principle: to learn to know the natural world, one must be present to it.

Theme 2: Interconnectedness of Life

A second tenet is the understanding of life as an interdependent whole, as opposed to a multiplicity of components. This concept receives a metaphysical expression in the vision of Isha Upanishad that all is one and a tangible form in the doctrine of Panchamahabhutas that states that human body and the surrounding world is made up of the same five elements. The educational consequence is an orientation oriented towards relationship and not division. It was this very perception that systems thinking has returned to modern science in Capra's portrayal of life as a series of interconnected systems, rather than a collection of discrete objects assembled (Capra, 1996). The modern is interdependent because it is ecological, the Indian tradition went back to that and brought ecology to the beginning of their way of seeing the world.

Theme 3: Environmental Stewardship

The third is an ethic of stewardship based on restrain. The first mention of "Sustainable use" is found in the Prithvi Sukta's prayer that the Earth not be "wounded" and that that which is taken be permitted to "return" (Atharvaveda 12.1.35; Prime, 2002). This was observed and not just proclaimed in the Gurukul, in the careful cultivation of land, water and forest resources on which the community depended. This principle responds directly to concerns of contemporary eco-pedagogy which aims to develop in learners, a sense of responsibility towards the Earth that is shared home and a sense of care for future generations (Gadotti, 2010; Kahn, 2010). The concept of stewardship, on both sides, is not one of limitation or restriction imposed on someone, but one of an inherent connection to a living order.

Theme 4: Simplicity and Sustainable Living

The fourth is the esteem for simplicity and for voluntary restraint of wants. The simple lifestyle of the hermitage—its little food, little property, its disciplined habits—was a symbol of and practice in non-possession (aparigraha) and self-restraint (dama) which the tradition considered essential prerequisites for clear thinking and ethical behavior. It was the first example of teaching sustainable living, an education in which learners are taught to differentiate between need and greed, and to live within their means. The principle addresses in a direct way a current situation of overconsumption which is largely responsible for the situation, and echoes the demand in education for the promotion of sustainable lifestyles instead of just knowledge on the environment (UNESCO, 2017). The Gurukul has proved that it is best to teach such a way of life not by exhortation but by living it.

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Theme 5: Holistic Development

A 5th principle is the dedication to the development of the whole person. The panchakosha model which together encompassed the physical, the vital, the mental, the mental intellectual and the spiritual provided the Gurukul with a framework for the development of knowledge, skill, and character in concert, rather than in isolation (Taittiriya Upanishad). Learning engaged the hands as much as the head and the responsibility of being ethical was seen as a part of the knowledge, not an extra add-on. The wholeness that is this is what eco-pedagogy aims to restore from the subject-oriented education which separates the cognitive, ethical and affective abilities of the learner, insisting on the development of all these abilities in harmony. The tested model of such integration in Indian tradition is such that being educated was being made whole.

Theme 6: Respect for Biodiversity

A sixth principle is strong regard for the varieties of living things. Vedic literature catalogues plants according to their medicinal values, and rivers, animals and forests are all considered as powers to be respected, and trees are highly revered, as is expressed in the famous saying that planting and nurturing a tree gives the merit of many sons (Padma Purana, 1888) . Later organised in the Vrikshayurveda, plant science of India, this attention towards diversity is due to a culture that highly esteemed it for its usefulness and its sanctity (Prime, 2002). The principle has grown in current relevance as species are becoming endangered by the hour, and provides an ethically grounded basis for the conservation ethic aimed at by environmental education. In the Indian vision of nature as kin, the value of each species was already enmeshed in a larger paradigm of biodiversity education's advocacy.

Table 2. From Traditional Practice to Modern Classroom Application

Traditional Practice	**Eco-Pedagogical Principle**	**Classical Concept**	**Modern Classroom Application**
Learning amid natural cycles in the Tapovana	Learning by Direct Experience	Anubhava (direct knowing)	Field trips, nature walks, outdoor and inquiry-based lessons
Study of the Panchamahabhutas and cosmic interdependence	Interconnectedness of Life	Ecological systems thinking	Cross-disciplinary units; food-web mapping; ecosystem studies

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Atharvaveda Prithvi Sukta; reverence for rivers, trees, and soil	Environmental Stewardship	Custodial ethics toward the natural world	Conservation pledges; river-adoption projects; tree-planting drives
Brahmacharya; simple residential life in the forest	Simplicity and Sustainable Living	Mindful consumption and restraint	Zero-waste classrooms; sustainable school timetabling; minimalism projects
Panchakosha development: body, breath, mind, wisdom, and bliss	Holistic Development	Education of the whole person	Yoga, arts, sports, contemplative practice alongside academics
Vrikshayurveda; herbal knowledge; reverence for all living beings	Respect for Biodiversity	Ahimsa-informed care for all species	Medicinal plant gardens; wildlife observation; ethnobotany units

7. RELEVANCE FOR CONTEMPORARY EDUCATION AND NEP 2020

The principles of eco-pedagogy, drawn from the ancient Indian education system are more than mere knowledge present in the ancient times. Their learning orientations, experiential engagement, systemic thinking, ethical formation, simplicity, holistic development and reverence for biodiversity are greatly needed in today's classrooms and are explicitly fostered by NEP 2020. This section explores the issues of convergence between the ancient model and the policy, and suggests that the principles outlined do not simply allow for integration in modern practice but demand a reorientation in the modern practice in terms of what they stand for. It also places this alignment in the context of the SDGs.

7.1 Experiential Learning

The common theme that connects the two is learning through experience. The NEP 2020 aims to shift the paradigm of conventional classroom teaching methods from mere memorisation to hands-on, competency-based, and inquiry-based education in which learner achievements are acquired through active engagement and interactions with the learner. (Ministry of Education, 2020) In substance, this is the principle of anubhava which was in force and was observed at the

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Gurukul where knowledge was confirmed in action and the learner was always an active participant and not a passive recipient. The tradition, not only provides historic validation of the direction of the Policy, but also gives an example of a proven model of organizing experiential learning to inculcate character and competence together. As it rebuilds experience as the medium of learning, NEP 2020, whether intentionally or unintentionally, seems to be going back to a pedagogical logic that was enunciated by India's education long ago.

7.2 Environmental Education

The theme of environmental awareness and environmental education of sustainability is one of the cross-cutting themes of NEP 2020, which aims to equip the learner with knowledge about the ecological system and an awareness of the environment (Ministry of Education, 2020). This goal is very similar to the "care of land, water and forest" part of the Gurukul philosophy, which was practiced as much as taught as an abstract obligation, and was a condition of life in the Gurukuls. Restrained and regenerative use, as expressed in the Prithvi Sukta provides a culturally relevant basis for contemporary environmental education, depicting conservation as the natural expression of one's belonging to a living order (Prime, 2002). The use of such sources enables EE in Indian schools to be based on an indigenous ethic instead of just imported frameworks.

7.3 School Gardens

The school garden will be one of the most tangible ways in which these principles can be put into practice. The turn of the abstractions of environmental study and the lived experiences of sowing, tending and harvesting brings together a plot of cultivated ground where students learn at first hand of the cycles of growth, demands of care and the sources of their own sustenance. It is the continuation of the agrarian labour that was a part of all the students' life in Gurukul where not only practical skills were taught but also the dignity of labour was also learnt (Altekar, 1965). But a well tended school garden is also a small theatre of biodiversity, showing children diversity of plant and insect life and how they inter-relate. The philosophy of experiential learning, sustainable living and respect for biodiversity is combined and concretized in this small place.

7.4 Outdoor Learning

The need for outdoor and place-based learning is a modernization of the Gurukul's context in the forest. Nature walks, field trips and lessons away from the classroom extend this connection with the living world that the tapovana was accustomed to, and brings a direct experience of it back into education which many teachers has come to understand is necessary for some form of learning. This kind of learning calms the mind, stirs up interest, and helps to identify where knowledge is specifically found as opposed to in a book's abstracts (Orr, 1992). It also responds to what Louv (2005) has termed "nature-deficit disorder," the growing estrangement of children from direct contact with the natural world. In the spirit of NEP 2020's emphasis on experiential and locally based pedagogy, the forest classroom could be revived following its institutionalization to become a part of school life.

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7.5 Art-Integrated and Activity-Based Learning

NEP 2020 encourages and supports art-integrated learning, where the learning process and activity form the bridge between the two ends of the continuum and develop to others.NEP 2020 calls for art-integrated learning to enhance engagement and learning for the entire learner and not just his or her intellect (Ministry of Education, 2020). This is in line with the Gurukul's emphasis on the all-round development, which is evident in the fusion of body, vitality, mind, intellect, and spirit as articulated and described in the Panchakosha model. With learning that involves the hands and the imagination as much as the memory, one becomes convinced of the need to develop competence, creativity, and character all together. Pupils who show their learning about the environment in art, craft, music or by dramatising have their knowledge embedded more powerfully and gain an emotional dimension. Art-integrated pedagogy therefore serves as a contemporary tool to achieve an old goal – educate a whole human being in learning, which touches each aspect of the human being.

7.6 Sustainable Development Goals

At its core level, the eco-pedagogical legacy of the Gurukul directly addresses the global agenda of sustainable development that is being discussed by the reader at the widest level. The principles discussed here—learning by experience, interconnectedness, stewardship, simplicity, holistic growth and respect for biodiversity—are exactly the types of knowledge and values that education systems have to provide, especially through the use of India's own cultural resources, as called for by SDG 4.7 (UNESCO, 2017). The tradition also relates to those who care for responsible consumption, climate action and land life protection, as all these need a disposition towards restraint and reverence, which the Gurukul aimed to engender. The model, then, provides India with a pathway to the SDGs which is both global and Indian.

8. EDUCATIONAL IMPLICATIONS

Many implications of the eco-pedagogical principles distilled in this paper do not only belong to one particular group. The Gurukul was a seamless educational mosaic, with learning, living and the environment all interwoven, so the quest to retrieve its learnings is a collective endeavor, spread across these various actors in the educational mosaic. Such an identification would only be a repetition in the micro-scale of what the tradition was fighting against: fragmentation. The implications therefore are divided into the six groups of stakeholder, understanding that meaningful change would be achieved if the groups could work together.

8.1 Policymakers and Curriculum Developers

The key takeaway for anyone who formulates education policies and curricula for policy and design is that ecological sensibility should be seen as an organising theme, not a new discipline. The mandate of the integration of the Indian Knowledge System and for experiential, holistic learning is already given in the NEP 2020, which calls upon learning at all levels to be designed such that all aspects of learning are addressed (Ministry of Education, 2020). It is up to curriculum bodies like the NCERT and the State Councils to render this mandate in their

Volume 5, Issue 2, 2026, p.63-82, ISSN 2583-6331
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syllabus, textbooks and assessment practices that reflect it. It involves integrating the eco-pedagogical principles into the existing subjects and for science, integrating their knowledge from traditional sources into the classroom science lessons, and not just into an environmental-studies classroom (NCERT, 2005). It goes without saying, it also involves creating assessment that can acknowledge experiential and competency based learning, because anything that is not assessed, is often forgotten. If unbacked up by structures, the principles may be aspirations that never become a reality in classrooms.

8.2 Teacher Educators and Teacher Education Institutions

Having the key implication for teacher educators is that prospective teachers need to experience the forms of learning that they will lead in the future. A teacher can't teach inquiry-based learning, outdoor learning, and environmental learning without having experienced it, and can't develop one own these other teachers without first experiencing it.It's hard to teach inquiry learning, outdoor learning, and environmental learning without experiencing it, and hard to develop environmental learning in others without experiencing it first (Orr, 1992). Therefore, programmes based on the National Curriculum Framework for Teacher Education must adopt experiential and activity based approach in their pedagogy, instead of just incorporating the term in it; and must also provide an adequate space in the curriculum of teacher preparation for ecological literacy and Indian knowledge traditions (NCTE, 2009; Ministry of Education, 2020) The image of the guru as a reminder here that in this tradition, teaching was as much through character and conduct as it was through instruction, and hence, the creation of teachers with an ecological awareness is a necessary precondition for an ecologically aware generation of learners.

8.3 School Leaders and Institutional Practice

The decisions made by school leaders and administrators have the indirect but significant educational influence of the conditions under which any pedagogy must function. The possibility of experiential learning, nature-based learning or the provision of a garden or an accessible outdoor area, or a flexible timetable, can make the difference as to whether such learning is at all possible, while the daily functioning of the institution, its management of water, waste, energy and green spaces is a strong hidden curriculum that teaches by example. A school that is visibly practising sustainability teaches far more effectively than any lesson on sustainability ever could, and the self sustaining hermitage of the Gurukul taught restraint and care through one's very way of life (Altekar, 1965). Therefore the implication for institutional leadership is to use the school as an instrument for educating about the environment, rather than as a neutral receptacle for this education.

8.4 Teachers and Classroom Practice

The principles represent a change in the role of the teacher from information provider to experience facilitator. Pedagogy is not new, but a new relationship with knowledge and with the learners; pedagogy by anubhava is less a technique, more a way of thinking about knowledge and learning through observation; a linkage of knowledge from a textbook with the local

Volume 5, Issue 2, 2026, p.63-82, ISSN 2583-6331
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environment. This teaching is asking for confidence in going beyond the security of the prescribed text and sensitivity in the particular environment where a school is located. It also requests that teachers be aware that they set the tone when they teach, and that what they show with their attitude is as valuable for students as what they explain to them in the classroom. In this way, all teachers take over in part the teaching by example of the guru.

8.5 Learners, Parents and the Community.

The principles also re-position the learner and people around him/her. Students don't just receive them, but are seen as active partners, whose curiosity, labour and care is central to their learning, and who can carry sustainable habits over into their homes. But parents and the community had a natural role to play in an education that is geographically grounded; the Gurukul was never cloistered behind a fence from the society that underpinned it. Ecosensing practices and traditional ecological knowledge of local people can be integrated with the school learning process, and community resources including sacred groves, water bodies, and traditional agriculture methods can be considered as living places of learning (Mishra, 2018). It is important to recognise these stakeholders, since it brings back to education the intergenerational and communal nature of the transmission of knowledge, not just from the teacher to the pupil but through the interconnection between a community and its surroundings.

9. CONCLUSION

The aim of the study was to investigate nature-based learning practices in Indian cultural norms of ancient education, which was confirmed by the analysis where the nature-based approach in learning was not aesthetic but integral to learning. The forest hermitage or Tapovana, direct observations of flora and fauna, and of the cycles of the earth and sky, experiential logic of anubhava, different schedules of domestic and agrarian tasks, and mutual discipline of living and learning together provide a heterogeneous description of the environment of this education in which living and learning are indistinguishable. The constructions of Altekar and Mookerji and the statements of the Vedic and Upanishadic texts have thus validated all these as the place, tool and instructor of education in the natural world. First, the Gurukul is no longer a school just happening to be in the woods, but rather a pedagogy, which can only be thought in the woods.

The second objective was to learn about the relevance of this nature-inspired approach to sustainable education and this paper therefore demonstrates direct relevance of the postings of today's sustainable world and the orientations achieved at Gurukul. Sustainable education as defined by SDG 4.7 is not only about the dissemination of facts about the environment; it's about reorientation, making it more like teaching ethical responsibility as part of education, and more like making it seem like humans are living in the order of life, not above it. The Gurukul tradition did not emphasize abstract ethical principles as restraint, regeneration and reverence towards nature, but rather manifested these values in day-to-day education. It was here that ecological responsibility was fostered as an orientation to life, such that learning was bound up in ethical involvement with the natural environment. This was in contrast to the modern tendency to distinguish objective knowledge from moral responsibility. The analysis then shows that nature-based learning is not only in harmony with the second objective, that of sustainable education,

Volume 5, Issue 2, 2026, p.63-82, ISSN 2583-6331
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but also provides a cultural lens that extends the current conversation on sustainable education as it connects environmental awareness to values and the education of Indigenous peoples.

This third step was to extract the eco-pedagogical elements from the Gurukul system to arrive at six principles: learning by doing, interconnectedness of all things, responsibility towards environment, simplicity and sustainable living, holistic development, and respecting biodiversity. The principles outlined here are never theoretically developed by the tradition itself, but are expressed within it and revealed in how it is read through and in relation to the tradition's future questions; those of the modern eco-pedagogy. The main conclusion of this convergence is that the perceived inheritance that is connected to contemporary problems can be charted as a more or less loose, meaningful and consistent philosophy of ecological education, as in the case of Orr, Gadotti, Kahn and Capra.

The fourth objective was to examine the relevance of these principles in the context of the education as per the NEP 2020, and it was observed that these principles were not only matched as a chance but rather a structurally matched one too. The experiential/competency building aspect of the Policy is reflective of the indigenous ethic of anubhava which is expressed as "Being in the World" in the Policy; the holistic approach/art-integrated learning is reflective of the panchakosha vision of the whole person which is expressed in the Policy by "Regenerative Use" prayed in Prithvi Sukta; and the focus of environmental education within the Policy is reflective of the indigenous ethic of anubhava, which is expressed as "Being in the World" in the Policy. The six principles validated and translated into school gardens, outdoor and place-based learning, and activity-based pedagogy, and spread across the roles and responsibilities of policy makers, teacher educators, school leaders, teachers, learners and communities, have given the vision of NEP 2020 some historical credence and a roadmap for implementation. The paper concludes that there is a culturally vibrant current for sustainable and inclusive education that India strives to instil today, that can manifest in the Sustainable Development Goals of UNSDG, but is distinctly Indian in form, in the principles of eco-pedagogy of the ancient Indian times. Further studies might be conducted on the impact of these ideas when they are explicitly applied to contemporary schools, and build on this conceptual foundation.

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