Indian Knowledge Systems

Perspectives and Practices

Editors

Prof. Birbal Saha, Ujjal Das, Dr. Anasuya Adhikari

First Wave Editions

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From the Editors' Desk…

The present edited volume, *Indian Knowledge Systems: Perspectives and Practices*, is conceived and realized at a significant moment in the intellectual, cultural, and educational trajectory of India. In recent years, there has been a renewed and vigorous engagement with indigenous knowledge traditions, driven not only by scholarly curiosity but also by a broader recognition of the need to decolonize knowledge systems, recontextualize epistemological frameworks, and rediscover culturally rooted paradigms of understanding. This volume emerges as part of that wider movement, seeking to bring together diverse perspectives that interrogate, reinterpret, and rearticulate the rich and multifaceted domain of Indian Knowledge Systems (IKS).

Indian Knowledge Systems represent one of the oldest continuous traditions of knowledge production in human history. Developed over thousands of years, these systems encompass a vast array of intellectual pursuits, including philosophy, science, mathematics, medicine, linguistics, arts, governance, and spirituality. However, what distinguishes IKS is not merely its antiquity or diversity, but its underlying philosophical orientation—a holistic and integrative worldview that seeks to harmonize various dimensions of existence. The interplay between the material and the spiritual, the individual and the collective, and the empirical and the transcendental forms the bedrock of Indian epistemology. Knowledge, in this tradition, is not an end in itself but a means toward self-realization, ethical living, and societal well-being.

The conceptualization of this volume was guided by the recognition that Indian Knowledge Systems cannot be adequately understood through a singular disciplinary lens. Instead, they demand an interdisciplinary and transdisciplinary approach that acknowledges the interconnectedness of different domains of knowledge. The call for chapters was therefore designed to encourage contributions from a wide range of fields, including education, philosophy, sociology, psychology, history, science, and cultural studies. The response to this call was both encouraging and illuminating, reflecting a growing interest among scholars and practitioners in engaging with IKS in meaningful and innovative ways.

The chapters included in this volume collectively demonstrate the depth and breadth of Indian Knowledge Systems. One of the central themes that runs through many of the contributions is the philosophical foundation of IKS. The Vedic and Upanishadic traditions, along with the classical Darshanas, provide a rich framework for understanding fundamental questions related to reality, knowledge, and existence. Concepts such as *Pramana* (means of valid knowledge), *Atman* (the self), *Brahman* (ultimate reality), and *Moksha* (liberation) continue to inspire philosophical inquiry and offer alternative perspectives to dominant Western epistemologies. The contributors engaging with these themes have not only revisited classical texts but have also sought to reinterpret them in light of contemporary concerns, thereby highlighting the enduring relevance of these ideas.

Closely related to the philosophical discourse is the exploration of educational practices within the Indian knowledge tradition. The Gurukul system, often idealized as a model of holistic education, is examined in several chapters from both historical and contemporary perspectives. Beyond its structural features, the Gurukul system embodies a set of pedagogical principles that emphasize experiential learning, character formation, moral development, and the cultivation of a deep and respectful teacher–student relationship. In contrast to the transactional and often fragmented nature of modern education systems, this model foregrounds the integral development of the learner. The relevance of these principles in the context of contemporary educational reforms, particularly the National Education Policy (NEP) 2020, forms a critical area of discussion in this volume. The policy's emphasis on multidisciplinary learning, experiential pedagogy, and the integration of Indian knowledge traditions resonates strongly with the themes explored in this collection.

Another significant dimension of this volume is its engagement with ancient Indian science and technology. There exists a persistent misconception that traditional knowledge systems are inherently unscientific or purely speculative. However, a closer examination of Indian intellectual history reveals a sophisticated tradition of empirical inquiry and scientific reasoning. Contributions in this volume highlight advancements in areas such as mathematics, astronomy, metallurgy, and architecture, demonstrating the methodological rigor and innovative spirit of ancient Indian scholars. These chapters not only document historical achievements but also explore their potential applications in contemporary contexts, thereby bridging the gap between past knowledge and present needs.

The inclusion of Ayurveda and Yoga as key components of Indian Knowledge Systems further underscores the holistic orientation of this tradition. Both systems are grounded in a comprehensive understanding of the human being as an integrated entity comprising body, mind, and spirit. Ayurveda, with its emphasis on balance, prevention, and individualized treatment, offers a compelling alternative to reductionist approaches to healthcare. Similarly, Yoga provides a framework for achieving physical health, mental clarity, and spiritual growth. In an era marked by increasing stress, lifestyle disorders, and mental health challenges, these systems are gaining global recognition for their relevance and effectiveness. The chapters addressing these themes explore both theoretical foundations and practical applications, contributing to a nuanced understanding of holistic health.

A particularly timely and significant theme addressed in this volume is the relationship between indigenous knowledge and sustainability. In the face of global environmental challenges, there is an increasing recognition of the limitations of industrial and extractive models of development. Indian Knowledge Systems, with their emphasis on ecological balance, resource conservation, and sustainable living, offer valuable insights for reimagining development paradigms. The chapters focusing on this theme explore traditional practices related to water management, agriculture, and environmental stewardship, highlighting their relevance in contemporary efforts to achieve sustainable development.

The comparative and interdisciplinary perspectives presented in this volume further enrich the discourse on Indian Knowledge Systems. By engaging with Western knowledge traditions and examining points of convergence and divergence, the contributors address important questions related to epistemic plurality, intellectual hegemony, and the decolonization of knowledge. These discussions are particularly relevant in the context of global academia, where there is a growing demand for more inclusive and diverse knowledge frameworks. The emphasis on interdisciplinary approaches also reflects the recognition that complex contemporary challenges require integrated solutions that draw upon multiple knowledge systems.

At a deeper theoretical level, this volume also engages with the question of epistemic justice and the politics of knowledge production. The marginalization of indigenous knowledge systems during colonial and postcolonial periods has led to an asymmetrical global knowledge order, where Western epistemologies have often been positioned as universal and superior. This collection implicitly and explicitly challenges such hierarchies by foregrounding the legitimacy, complexity, and applicability of Indian Knowledge Systems. In doing so, it aligns with broader decolonial discourses that seek to democratize knowledge and create space for multiple ways of knowing.

Furthermore, the methodological diversity reflected in the chapters deserves special mention. The contributors employ a wide range of approaches, including textual analysis, philosophical inquiry, historical reconstruction, ethnographic exploration, and empirical investigation. This methodological plurality not only enriches the content of the volume but also reflects the inherently interdisciplinary nature of IKS. It underscores the need to move beyond rigid disciplinary boundaries and to adopt more flexible and integrative research frameworks when engaging with complex knowledge traditions.

Another important contribution of this volume lies in its attempt to bridge theory and practice. While several chapters engage with classical texts and theoretical constructs, others focus on contemporary applications and lived practices. This balance is crucial for ensuring that Indian Knowledge Systems are not relegated to the realm of abstract or antiquarian interest but are recognized as dynamic and evolving systems with practical relevance. Whether it is in the domain of education, healthcare, governance, or environmental sustainability, the insights derived from IKS have the potential to inform innovative solutions to contemporary challenges. The global relevance of Indian Knowledge Systems also emerges as a key theme in this collection. In an increasingly interconnected world, there is a growing recognition of the need for cross-cultural dialogue and knowledge exchange. IKS, with its emphasis on holistic thinking, ethical living, and ecological balance, offers valuable perspectives that resonate beyond the Indian context. The integration of these ideas into global academic and policy discourses can contribute to the development of more inclusive and sustainable models of knowledge and development.

The editorial process for this volume has been guided by a commitment to academic rigor, ethical standards, and inclusivity. All submitted manuscripts underwent a blind peer review process,

ensuring that the selection of chapters was based on merit and scholarly quality. The diversity of contributions reflects our effort to include voices from different disciplines, regions, and academic backgrounds. Such diversity is essential for fostering a rich and dynamic dialogue on Indian Knowledge Systems.

We extend our sincere gratitude to all the contributors who responded to the call for chapters with enthusiasm and dedication. Their scholarly engagement and intellectual contributions have been instrumental in shaping this volume. We are equally grateful to the reviewers for their critical insights and constructive feedback, which have significantly enhanced the quality of the chapters. Our appreciation also goes to the publishing team for their support and professionalism throughout the process.

As editors, we recognize that this volume represents only a beginning rather than a conclusion. The field of Indian Knowledge Systems is vast and continually evolving, offering immense possibilities for further research and exploration. Future inquiries may focus on deeper empirical validation of traditional practices, integration of IKS with emerging technologies, and the development of pedagogical models that effectively incorporate indigenous knowledge into contemporary curricula. There is also a need for greater institutional support, interdisciplinary collaboration, and international engagement to advance the study of IKS. In conclusion, *Indian Knowledge Systems: Perspectives and Practices* seeks to serve as both a scholarly resource and an intellectual invitation. It invites readers to rethink conventional assumptions about knowledge, to rediscover the richness of indigenous traditions, and to engage in a meaningful dialogue between the past and the present. By bringing together diverse perspectives and approaches, this volume aims to contribute to the creation of a more inclusive, holistic, and sustainable knowledge paradigm.

We hope that this volume will not only enrich academic discourse but also inspire a broader appreciation of the enduring relevance of Indian Knowledge Systems in shaping the future of education, research, and society.

— Editors

Prof. Birbal Saha
Ujjal Das
Dr. Anasuya Adhikari

Introducing the Editors

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Prof. Saha an alumnus of the prestigious Visva-Bharati, Santiniketan, has authored and edited 15 books and has been associated with teaching since 2003. An eminent Professor of Education in Sidho-Kanho-Birsha University, West Bengal, India, is acclaimed for his erudite contribution to Social Science and graces the Editorial Board for more than 20 journals famed in India and abroad. The educationalist is a prestigious Member of Global Educational Research Association (GERA), Indian Association of Teacher Education (IATE) and All India Association for Educational Research (AIAER). He holds honorary position in diverse academic and administrative committees. He is the author of more than 100 scholarly research articles and book chapters. He ranks in AD Scientific Index and has h-Index 35. His research works are extensively recognized and credited by scholars around the globe. He was graced with National Educational Leadership Award, Indo-Nepal Unity Award, A.P.J. Abdul Kalam Peace Award and Pride of Asia International Award. Prof. Saha is cheered for his contribution and scholarly interest engrossing Educational Psychology, Teacher Education, Educational Technology and Language Education. Prof. Saha is available at birbalsaha@gmail.com

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RELIGIOUS HARMONY AND INTEGRATED CULTURAL TRADITIONS IN VAISHALI: ASPECTS OF BUDDHISM, JAINISM AND GUPTA-ERA SHAIVISM

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Abstract: Syncretism has been one of the most fundamental features of Indian civilization. India's cultural heritage has not only assimilated various religious, philosophical, and social streams but also given them a shared cultural platform. This is the very feature that has secured for the Indian culture a place among the most ancient and most dynamic civilizations of the globe. This syncretic cultural activity has had an important center in Vaishali in Bihar. Here, many archaeological artifacts relating to Buddhist philosophy, Jain philosophy, and Brahmanical traditions have been uncovered, which indicates the diversified and co-existential past of the region. Vaishali was one of the ancient republics of India. It was the capital of the Licchavi Republic and a land rich in terms of politics, culture, and religion. This is the area where Lord Buddha visited several times and gave one of his last sermons. Here too was born Lord Mahavira, the 24th Tirthankara of Jainism. Moreover, the Shaiva, the Vaishnava, and other Brahmanical religious orders flourished here during Gupta times. The statues of Lord Shiva of the Gupta period found in the Vaishali region are a sign that a legacy of religious tolerance and cultural harmony was carried on, evolving in this region. In this way, Vaishali is not only a religious center but also a living example of the composite culture of India. During this period, the Buddhist, Jain, and Hindu traditions developed in parallel and influenced each other. This chapter addresses the concept of this composite civilization based on the Buddhist, Jain, and Gupta period Shaiva legacy found in the Vaishali area. Therefore, a qualitative and descriptive technique has been employed, taking into account both primary and secondary sources, as well as different periodicals and journals, so that the research paper is created with the best quality and academic rigor.

Cultural and Historical Backgrounds

Vaishali is a very ancient and wonderful place. Vaishali is known as a flourishing city in Buddhist and Jaina literature. It is regarded as a prime example of republicanism in ancient India, being the capital of the Licchavis. Here, the social and political organization was already partially developed. Buddhist texts describe Vaishali as a wealthy city, graced with gorgeous gardens and magnificent *viharas* (monasteries). The geographical setting of Vaishali was also highly crucial for its development. It was relatively close to the Ganges and developed into a major center of trade and travel. This area of North Bihar was also an important route connecting Nepal with the Gangetic plains. There was, therefore, a constant movement of intake and outflow of different cultures, merchants, visitors, and religious lecturers into the area. It is for this reason that Vaishali became a big center of cultural exchange. The archeological evidence unearthed at Vaishali clearly shows the presence of many religious traditions in the area. The Ashoka Pillar, Buddhist stupas, *viharas*, Jain temples, and Hindu sculptures of the Gupta period all provide testimony to the rich cultural past of this region.

Introduction of Vaishali District (Bihar)

Population (2011)	Population – 34,95,249 Male 18,47,049 Female 1648191	Rural Population (2011)	Population 3,262,715 (93.35%) Male- 1723220, Female- 1539488
Urban Population (2011)	Pupulation - 232,534 (6.65%) Male- 123829, Female - 108703	Geographical Area (km^2)	2036
Literacy (%)	68.6	Sub-Division	03 (Hajipur, Mahnar, Mahua)
Female Literacy (%)	59.1	Block (According to census of year 2011)	16 (Vaishali is aslo a Block) Total Population 1,46,364
Male Literacy (%)	77	Town	03

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Village Panchayat	290	Total no. of Village	1414

Source - https://vaishali.nic.in, Bihar Govt.

Buddhist Philosophy and Its Cultural Role in Vaishali

Buddhist Philosophy and Place in Culture in Vaishali. Historically, Vaishali has been an important center of Buddhism. Lord Buddha visited Vaishali many times during his lifetime. Buddhist literature states that the Buddha delivered many important talks here at Vaishali. Here, he also proclaimed his Mahaparinirvana, which refers to his final passing. The Second Buddhist Council was also held in Vaishali. This event is of great importance in the history of Buddhism. The Buddhist remnants found in Vaishali include stupas, viharas, and the Ashoka Pillar. The Ashoka Pillar is an outstanding example of Mauryan-era art. The lion capital is said to be a symbol of the spread of Buddhism and of the religious policies of Emperor Ashoka. The stupas here were built with the purpose of protecting the relics and recollections of the Buddha. Vaishali's social and cultural fabric was deeply affected by Buddhist doctrine. The local society was given a humanistic viewpoint by principles such as nonviolence (ahimsa), compassion, the Middle Path, and equality. Buddhism denied the segregation of castes and ritualistic customs and stressed the value of an ethical life. The Buddhist viharas of Vaishali were the centers of learning and cultural activities. Monks and students from anywhere would come here to study. Vaishali thus became the center of knowledge and intellectual legacy.

Archaeological Excavation Buddhist Sites of Vaishali

Buddhism aimed to incorporate local cultures and traditions, not throw them out. This is why Vaishali has a lovely blend of Buddhist art and local folk practices. Its sculpture and architecture give a clear glimpse of Indian cultural values.

The Jain Philosophical Tradition at Vaishali

Vaishali is regarded as a very sacred place of Jainism. Lord Mahavira was born at Kundalpur near Vaishali. Mahavira spent a significant portion of his life in this region. Vaishali is described in Jain literature as a city of immense religious and cultural importance. Jainism became immensely popular in the Vaishali region due to the teachings of Mahavira. The concepts of *Ahimsa* (non-violence), *Aparigraha* (non-possession), *Satya* (truth), and self-restraint provided the moral compass for the society. Jainism guided people on the path of self-purification and penance. The remnants of the Jains at Vaishali show that the Jain community here was prosperous and active. The area is home to a religious diversity, which is reflected in its Jain temples, idols, and pilgrimage destinations. Jainism exerted a huge effect on the commercial society and the urban life. Vaishali was a city of very great commercial importance, and hence Jainism spread rapidly in the region. The non-violent and ethical way of life of Jainism promoted social harmony.

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The Vaishali region associated with Lord Mahavira

The Concord of Buddhist and Jain Traditions

Vaishali has been an important site in the Indian religious and cultural history where both Buddhist and Jain traditions prospered side by side. Lord Gautama Buddha had visited Vaishali many a time to impart his teachings and to preach the messages of compassion, non-violence, and the Middle Path. Lord Mahavira was born in Kundagram, in the Vaishali region, which is also important to Jainism. Both religions stressed ethical life, self-restraint, and truth, not Vedic rites. The same doctrinal underpinning led to a spirit of harmony and co-existence among the followers of Buddhism and Jainism at Vaishali. Here, despite the multiplicity of faiths, there is a heritage of mutual respect and dialogue. The culture of Vaishali was such that the Buddhist and the Jain faiths were able to grow as complementary influences. Both religions emphasized the basic tenets of non-violence, asceticism, compassion, and human welfare, thus promoting ethical norms in society. Religious teachings and sermons had a great role in motivating people to be tolerant and live peacefully. The republican spirit of the area also favored religious tolerance and intellectual freedom. Thus, Vaishali was not just a religious center but also a symbol of cultural fusion and social peace. This peaceful co-existence of the Buddhist and Jain faiths is a real example of the open and inclusive spirit of the Indian civilization.

The Shaiva Tradition and the Shiva Idols of the Gupta Period

Historians view the Gupta period as the golden age of Indian history. During this period, art, literature, religion, and architecture flourished to a degree never before seen. The presence of the Gupta period Shiva images in the Vaishali region is indicative of the effect of Shaivism in this region. The sculpture of the Gupta period is a representative of the apex of Indian art. These Shiva statues are full of spirituality, emotion, and harmony. The recovered Shiva idols from Vaishali are a monument to the superb craftsmanship of the artists of the Gupta dynasty. The sculptures are of Shiva in a holy, serene, and serious mood. The idols are quite expressive of the special characteristics of Gupta art in their decorations, hairstyles, and attitudes. The Gupta period was a resurgence of the Brahmanical religion, but it did not mean that other religions were banned. In fact, the Gupta period was a time when Buddhism, Jainism, and Hinduism developed together. The Vaishali region is a very good example of this phenomenon. The Shaiva tradition arose in contact with indigenous religious concepts and with Buddhist and Jain thought. The sacred art of the Gupta period is a positive indication of the spiritual and moral nature of the syncretic culture of India.

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Image of a Shiva statue

The concept of an integrated culture in Vaishali

Historically, Vaishali has been one of the main cultural sites of ancient India, where a wonderful confluence of numerous religious and philosophical traditions exists. Buddhism, Jainism, and Hinduism grew up side by side here, each influencing the beliefs and cultural values of the other. The doctrine of Lord Buddha fostered an attitude of compassion, non-violence, and equality. Lord Mahavira's Jain philosophy had stressed self-restraint, non-possession, and ethical behavior. The Shaivite tradition also became important in the Gupta period, and its influence increased the Hindu religious consciousness in the region. All these traditions co-existed, forming Vaishali, a center of religious tolerance and cultural variety. Followers of different faiths performed their religious ceremonies without any dispute and developed a sense of societal peace and harmony. Thus, Vaishali became a living testimony to the entwined culture of India. This integrated culture is also very much evident in the art, architecture, and social fabric of Vaishali. The Buddhist stupas, Ashokan pillars, Jain sculptures, and Gupta-period images of Lord Shiva all evolved from a shared cultural background and are markers of religious harmony and cultural co-existence here. There is also spirituality, harmony, and ethics in the sculpture and architecture in the area. Hindu traditions maintained religious and cultural continuity while Buddhism and Jainism preached peace and social equality. All these qualities combined gave Vaishali social amity and cultural togetherness. The region is known for the rich tapestry of cultural diversity in folk traditions, festivals, and holy places, which are reflective of the liberal and syncretic traditions of Indian civilization.

The Value of Archaeological Evidence

The archaeological digs carried out at Vaishali have unearthed some items that are crucial evidence of the rich cultural and religious history of the region. The Ashoka Pillar here is another feature of the Mauryan era's art and promotion of Buddhism. The emperor Ashoka erected this pillar, demonstrating his profound respect for Buddhism and the sanctity of Vaishali. Moreover, the discoveries of stupas and viharas at Vaishali prove that this region was a significant focus of Buddhist learning, faith, and worship. These remains also point out that Vaishali was a big hub for the propagation of Buddhism around the world in ancient times. "The style of architecture and construction methods used here is a wonderful representation of the high art and craft traditions of the time. These archeological treasures still provide a clear view of the historical splendor and cultural wealth of Vaishali. The finding of Jain iconography, temple ruins, and Shiva sculptures of the Gupta period from Vaishali shows the syncretic culture and religious heterogeneity of the region. The vestiges of Jain culture indicate that Vaishali was one of the primary centers of Jainism, and the teachings of Lord Mahavira had a deep impact here. The Shiva sculptures of the Gupta period, on the other hand, indicate the development of Hinduism and, more notably, the Shaivite tradition. These sculptures are

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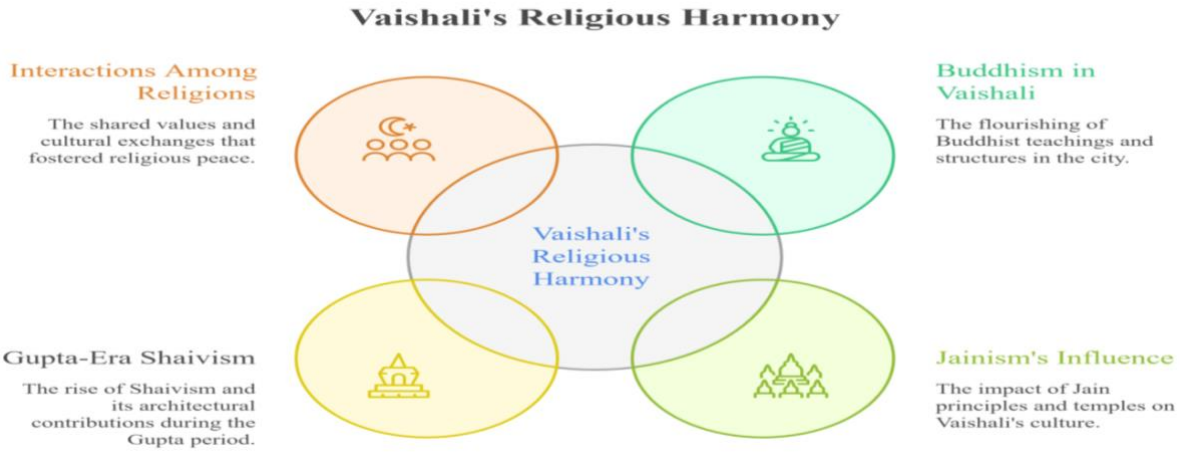
indeed specimens of artistic brilliance, spirituality, and aesthetic beauty typical of the iconography of the Gupta period. The presence of Buddhist, Jain, and Shaivite artifacts in the same area proves that Vaishali was a major center of diverse religious traditions and cultural harmony. This archeological evidence is not only of historical interest but also of essential importance for an understanding of the tolerant and syncretic traditions of Indian culture.



Vaishali's Syncretic Culture in the Modern Context

The syncretic culture of ancient Vaishali is a wonderful source of inspiration in the modern world, where many countries are faced with problems like religious intolerance, cultural strife, and societal disintegration. Vaishali is the symbol of Indian culture, where we can see the co-existence of many religions, faiths, and cultural traditions. The city was a place where Buddhism, Jainism, and Hinduism co-existed peacefully. This has brought about an attitude of respect and tolerance for each other. That is why it is not only a city from the past but also a symbol of cultural concord and social unity. The historical heritage of Vaishali is proof that unity in variety has been the very kernel of Indian civilization. The city became a major spiritual and cultural center due to its strong association with Lord Buddha and Lord Mahavira. The stupas, Ashoka Pillar, Jain temples, and other religious sites here attract devotees and tourists from all over the world even now. These cultural sites have to be preserved not only for their historical importance but also because they are still living symbols of India's cultural diversity and religious amity.The government and local institutions are active in many efforts for the preservation of the heritage of Vaishali and the promotion of tourism in the region. If these projects are implemented more effectively and the cultural character of Vaishali is projected on an international platform, it can become a world-class center of cultural and spiritual tourism. The syncretic culture of Vaishali thus sends a powerful message of tolerance, peace, and human association to modern society.

Closing thought

Vaishali is a positive example of Indian synthesis, religious tolerance, and multicultural traditions. Vaishali of old was not only a political and economic powerhouse but also a vital center for the harmonious coexistence of different religions and streams of culture. At this time, Buddhism propagated the message of compassion, the Middle Path, and social equality; Jainism propagated non-violence, asceticism, and self-control, while the Shaivite traditions of the Gupta period centered on spiritual consciousness, creative expression, and cultural continuity. The confluence of different cultures led to a synthesis of cultural awareness in Vaishali marked by the spirit of cohabitation, tolerance, and social peace. The Ashoka Pillar, the stupas, the monasteries, the ancient temples, and the Jain monuments are the living testimonials of this many-sided cultural heritage of the archeological treasures of Vaishali. These monuments serve as a testament to the fact that the fundamental ethos of Indian culture has always been unity in diversity and

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tolerance of numerous faiths. In today's time, when society is struggling with the issues of religious and cultural divisions, the history of synthesis and harmony in Vaishali might be a tremendous source of inspiration for mankind.

Suggestions

The government, the Department of Archaeology, and the educational institutions should collaborate for the preservation and promotion of the rich cultural legacy of Vaishali. Special attention should be paid to the preservation of its historical sites, to their scientific excavation, and to digital fixation. In addition, the syncretic culture of Vaishali should be added to the school and university syllabi so that the younger generation may grasp the importance of religious tolerance and cultural peace. If this history of Vaishali is showcased properly on an international platform, it can be a significant hub of global peace, cultural dialogue, and spiritual tourism.

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FROM MUNSHI RAM TO SWAMI SHRADDHANAND: AN INTELLECTUAL AND INDIAN KNOWLEDGE SYSTEM (IKS) BASED STUDY

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Abstract: Swami Shraddhanand was the name later given to Munshi Ram Vij, who thus can be seen as an essential link to the reformist tendencies of the 19th, century north Indian and the vigorous nation, building enterprises of the early 20th century. Munshi Ram, who was born in 1856 in Punjab, was raised in an environment that was not only marked with colonial pressure and social inequalities, but also had the intellectual vibrancy of Arya Samaj present in it. He started off by working in the government as a revenue official and was even recognized for his practical administrative talents, but later on he became enamored with the idea of moral reform and Vedic revivalism, which was a movement led by Swami Dayanand Saraswati. In fact, his meeting with Dayanand made him re, think his philosophy of life, and he began to slowly but surely become transformed from the inside out which, in his case, was a major part of his activism and scholarship. Three distinct stages basically mark the intellectual evolution of Munshi Ram. His very first stage was the one when he critically engaged with colonial modernity and he embraced rational inquirybut at the same time he rejected Western cultural domination. The second one, which was mainly characterized by leadership qualities, saw him starting the Gurukul Kangri in 1902 as an institution that would bring about a modern, Vedic educational system based on the teachings of the Vedas rather than the traditional colonial one which emphasized recitation of the text, nationalism, and moral values. After the third stage, which saw him giving up the world and taking up the monastic life under the name of Swami Shraddhanand, he changed over to a more militant social activism which was primarily through the Shuddhi movement, his anti, untouchability campaigns, and his vehement participation in the Indian freedom struggle. He, through the vehicle of his literary works, oratory, and educational reforms, was ever ready to uphold Vedic universalism, national self, respect, and ethical citizenship. His evolution from Munshi Ram to Shraddhanand was not just a conversion of the spirit; it stood tall for a conscious intellectual move, from an interrogative reformist stance to a positive nation, building view which was rooted in indigenous wisdom.

Introduction

Munshi Ram Vij's life voyage, who was later called Swami Shraddhanand, is one of the most amazing changes to happen in Indian social and intellectual history of the recent times. He was born in the second half of the 19th century and matured at a time when the colonial regime was changing Indian society and traditional ways of knowledge were getting more and more pressured (Sharma 1992, p. 45). His childhood was a reflection of the ambitions of a young Indian who was looking for a job in the administration and social mobility within the colonial framework (Joshi 2008, p. 102). However, Singh (2015, p. 78) states that beneath this apparent acceptance of British modernity there was a growing discontent with social inequalities, religious misrepresentations, and cultural subjugation that he experienced Parts of Munshi Ram's slow change to Arya Samaj reformism can be attributed to the impact of Swami Dayanand Saraswati and the general enlightened revival which was not only about reviving the Vedic principles but also about examining the modern issues critically (Chandra 2003, p. 56).

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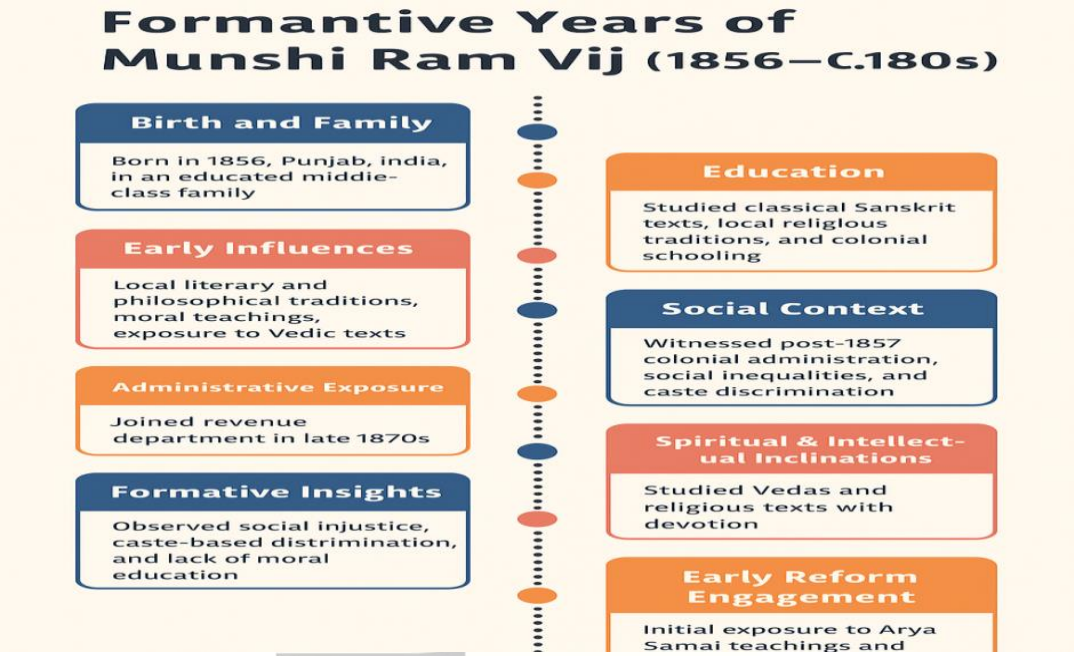

His move to start Gurukul Kangri at the beginning of the twentieth century was very much an educational idea that emphasized the integration of the ancient learning with the patriotic idea (Yadav 2010, p. 89). The school tried to become the new source of the development of characters, making it different from the Westernized colonial institutions (Verma 2001, p. 33). Throughout the years Munksi Ram expanded his intellectual horizons and moved away the one time reformist lyrics to more impressive vocal of social change and national identity. With his going sannyasa as Swami Shraddhanand and tying the knot with the event it was, to a large extent, not only a personal spiritual decision but also an ideological drift (Puri 2018, p. 112).As a new person, he started to play a leading role in the social equality, religious reform, and freedom of the people's movements. The change from a state officer to a social revolutionary is an example of how the three things of intellectual commitment, spiritual evolution, and political responsibility, which came together to make Munshi Ram a nationalist figure of great influence (Roy 1997, p. 71)

Early Life and Formative Years (Munshi Ram Vij, 1856–c.1880s)

Munshi Ram Vij came into this world in the year 1856 in Punjab, a region that was witnessing a lot of social, political, and cultural changes, during the British colonial rule (Sharma 1992, p. 23). His family was of the educated middle, class, which gave him an opportunity to get a formal education at a time when literacy and schooling were scarcely available in the villages of India (Joshi 2008, p. 54). His initial exposure to the classical Sanskrit texts, local religious traditions, and moral teachings significantly impacted his intellectual curiosity and ethical sensibility (Chandra 2003, p. 34).Even in his early years, Munshi Ram was very hardworking and possessed great self, control, which were the characteristics that he was later to be known for in his way of social reform and educational leadership (Singh 2015, p. 45).Munshi Ram Vij was born in 1856 in the Punjab region, during a period of significant social, political, and cultural change under British colonial rule (Sharma 1992, p. 23). His family belonged to the educated middle class, which enabled him to access formal education at a time when literacy and schooling were not widespread in rural India (Joshi 2008, p. 54). Early exposure to classical Sanskrit texts, local religious traditions, and moral teachings laid the foundation for his intellectual curiosity and ethical sensibilities (Chandra 2003, p. 34). From a young age, Munshi Ram displayed remarkable diligence and discipline, qualities that would later define his approach to social reform and educational leadership (Singh 2015, p. 45).

Aspect	Details	Significance / Impact

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Birth and Family	Born in 1856, Punjab, India, in an educated middle-class family	Provided access to formal education and early exposure to moral and cultural values
Education	Studied classical Sanskrit texts, local religious traditions, and colonial schooling	Developed intellectual curiosity, discipline, and foundation in ethics and spirituality
Early Influences	Local literary and philosophical traditions, moral teachings, exposure to Vedic texts	Sparked interest in social reform, ethical living, and Vedic scholarship
Social Context	Witnessed post-1857 colonial administratio social inequalities, and caste discrimination	Formed early awareness of societal challenges and need for social regeneration
Administrative Exposure	Joined revenue department in late 1870s	Gained practical skills in administration, governance, and understanding of common people's struggles
Spiritual & Intellectual Inclinations	Studied Vedas and religious texts with devotion	Combined scholarship with moral and ethical inquiry; laid groundwork for future reformist thinking
Formative Insights	Observed social injustice, caste-based discrimination, and lack of moral education	Motivated him to seek paths for societal improvement through education, reform, and later activism
Early Reform Engagemer	Initial exposure to Arya Samaj teachings an Swami Dayanand Saraswati's ideas	Sparked interest in religious and social reform, laying the foundation for his later transformatio into Swami Shraddhanand

When he was a teenager, he saw the social inequalities and moral decay that had affected the Indian society in parts especially after the 1857 revolt and the tightening of British administrative structures (Roy 1997, p. 18). These initial experiences shaped his understanding of the need for a society and a moral revival. Apart from his education, Munshi Ram's childhood was also marked by his energetic involvement in the literary and philosophical heritage of the area. He was engrossed in the Vedas and other ancient Indian texts, which he looked up very eagerly as he was an early and rare mixture of intellectual rigor and spiritual inquiry (Verma 2001, p. 27).

Swami Shraddhanand in his early life[1]

By late 1870s, Munshi Ram has gone into the government service and started working in the revenue department. From this, he got hands, on knowledge of the administration, governance, and the working of the colonial bureaucracy (Yadav 2010, p. 41). Parallel to this, living among common people exposed him more to their problems. These were the people, who grew crops, did labor work, and were skilled in some craft. He saw a decline of morals, the discrimination of caste, and widespread ignorance all around, which he eventually tried to eradicate through education and social activism (Puri 2018, p. 63). It was also the period when Munshi Ram got familiar with the teachings of Swami Dayanand Saraswati and the Arya Samaj movement, who he came later to be significantly

[1]Internet Archive Book Images - Image from page 238 of "The Arya samaj; an account of its origin, doctrines, and activities, with a biographical sketch of the founder" (1915), सार्वजनिक डोमेन, https://commons.wikimedia.org/w/index.php?curid=39392877)

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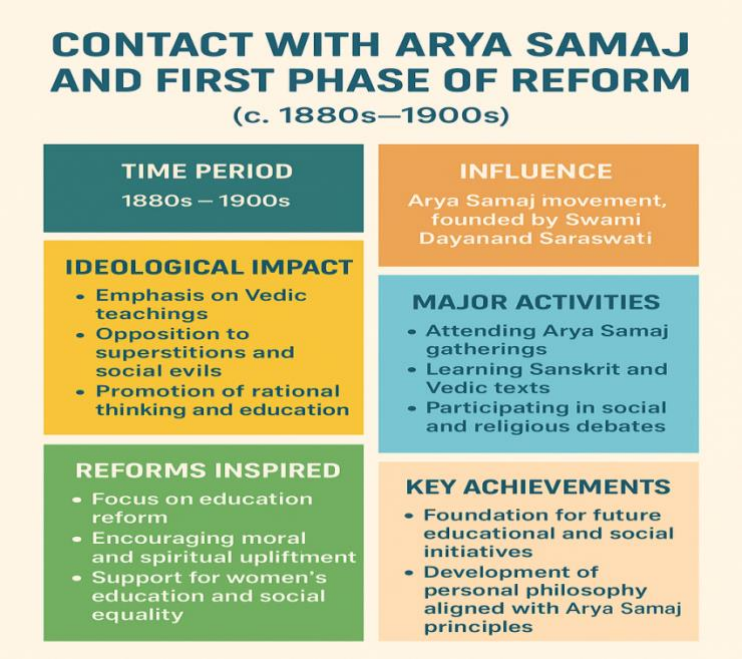
influenced by, but did not give up his worldly life immediately (Chandra 2003, p. 56). He recognized the necessity for the reformer who would not only inspire spiritually but also execute the reforms intelligently and with social involvement. Combining his time for inner reflection, his stint as an administrator, and his scholarly pursuits laid the groundwork for his later metamorphosis into Swami Shraddhanand, the social reformer, the educator, and the nationalist leader who ideologically tried to bridge the gap between the past and the present (Sharma 1992, p. 46).

These elements later became the foundation of his lifelong dedication to spiritual and social reform (Joshi 2008, p. 59).Contact with Arya Samaj and First Phase of Reform (c. 1880s–1900s) By the time it was 1880s Munshi Ram Vij's intellect and morality had developed and as a result, he went beyond the surface and wanted to get involved more with the social and religious reform. A meeting with Swami Dayanand Saraswati, the founder of the Arya Samaj, was really a turning point in such a way that Munshi Ram Vij was following the path of reform (Analyse the Slogan "Go Back to Vedas". | Filo, 2024, Chandra 2003, p. 56). The features that most impressed Munshi Ram were Dayanand's reliance on the Vedas as the ultimate source of knowledge, refusal of the rites distorted by the ritual and giving preference to moral and social upliftment. It is said that as a result of these teachings Munshi Ram did not throw off the world at once but rather these concepts inspired him to make a life, long pledge to carry out reformist acts which were a combination of rational inquiry and spiritual discipline (Sharma 1992, p. 52).



During this time Munshi Ram immersed himself in the Arya Samaj movement, and he was prominently involved in its educational and social activities (Joshi 2008, p. 78). He was a major force in the return to the Vedic teachings as well as the promotion of social equality with special emphasis being placed on the down trodden. Besides, his initiatives included the spread of modern education charged with ethical and spiritual values, a tenet which eventually became the foundation of Gurukul Kangri (Verma 2001, p. 42). The first chapter of his reformist activities was characterized by the blend of scholarship, oratory, and social activism. Munshi Ram started mobilizing the villages, giving speeches, and encouraging women's education, the abolition of caste discrimination, and the revival of moral standards (Singh 2015, p. 63). With his experience, he could very well oversee the implementation of the reforms thus skillfully handling the transition from theory to practice (Puri 2018, p. 79).

By the end of the 1890s, Munshi Ram was a leader deeply respected and admired in the Arya Samaj groups, and he was known for his efforts, capabilities to manage the organization, and his sharp intellect (Yadav 2010, p. 95). It was the time when he was preparing for the changeover to Swami Shraddhanand, the person to not only lead the

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religious reform but to be actively involved in building the nation and the advancement of education. The coming together of Vedic philosophy, the good moral character, and the proper social work during those years is the conclusive evidence that this was the beginning of a lifetime's goal of social change.

Location Formation: Creation of Gurukul Kangri University and Educational Reform (1902, 1917)

It was the beginning of the 20th, century when Munshi Ram Vij took a deep turn and focused on the creation of new educational frames and social institutions to realize his vision. The very same year 1902 saw the birth of Gurukul Kangri University in Haridwar made possible by the devoted efforts of the man in question and it was a kind of institution which reconciled the ancient Vedic studies with the contemporary subjects bearing the imprint of his conviction that education is the most efficient tool for the moral, social, and national regeneration (Verma 2001, p. 52). The Gurukul was not simply a school but rather an all, round personality shaping center where students could learn ethical principles, self, control, and a feeling of being part of the nation together with the academic knowledge (Sharma 1992, p. 67).

Among others, the educational philosophy of Gurukul Kangri drew a lot from the Arya Samaj's stress on Vedic teachings but at the same time it utilized the teacher's new methods by introducing subjects like science, mathematics, and social studies to make the students capable of dealing with the modern world (Chandra 2003, p. 74). In addition, physical education, vocational training, and community service were the components of the Swami's vision of the ideal education system, which he felt should lead to the harmonious development of the intellect, the body, and the spirit (Yadav 2010, p. 103).

On the other hand, institution building was also a reflection of his hands, on leadership skills. He was very thorough in planning the management of the Gurukul, he went into the market to look for good teachers and he set up a curriculum, which was balanced in terms of the spiritual, intellectual, and practical aspects of the subjects (Joshi 2008, p. 91). What is more, he was not passive in his pursuits, and he got the support of the network of reformists, money, givers, and town folks thus coming up with a model of education, which was democratic, self, reliant, and Indian, based (Singh 2015, p. 82).

Among other things, Swami Shraddhanand during this time also extended his social reform programs through the Gurukul, he was the most ardent supporter of women's education and the most fierce enemy of caste practices, as well as the promoter of the ethical citizenship (Puri 2018, p. 97). By marrying education and social reform, the Gurukul turned into a core for the nationalist and cultural revival movements and was the source of the fresh wave of such institutions all over India.

The establishment and development of Gurukul Kangri University are the examples of Swami Shraddhanand's educational ideologies that were aimed at societal change and the most powerful tool in his hands. The first 15 years of the 20th century, for which we have data, are the proof of the model that he worked out, which was capable of neither coming in conflict nor creating chasms between lifes and worlds of the past and present and thus prepared the new generations to be efficient and loyal citizens of society and the budding Indian nation.

Transition to Sanyasa and New Identity (1917 onwards)

Munshi Ram Vij by 1917 had changed his personal and intellectual perspective so deeply that he decided to follow the path of sannyasa and became known as Swami Shraddhanand. In addition to signifying a spiritual letting go of worldly things, this change also showed that he saw himself differently as a reformer of society and a leader of the nationalist movement (Sharma 1992, p. 78). Living as an ascetic, he could henceforth devote all his time and effort to popularizing the ethical, educational, and social reform works that he had been doing without the need to attend to personal or administrative affairs (Puri 2018, p. 115).

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With the name Swami Shraddhanand, his association with the Arya Samaj movement became more intense, he was on the front lines of the movement calling for a return to purity of morals, fairness in society, and the rousing of the nation Chandra (2003, p. 89). The Shuddhi movement, of which he was a leading figure, found him reaching out to the previously disinherited groups and inviting them back to the great family of the Hindu society and at the same time preaching the universal principle of the equal worth of all human beings (Singh 2015, p. 102). Moreover, his metamorphosis into a Swami gave him more clout in the sphere of educational reform as he kept on directing Gurukul Kangri and other places of learning, making them turn out not just to be centers of gaining knowledge but also of teaching of good moral and civic behavior (Verma 2001, p. 67).

Swami Shraddhanand's renunciation of the world was not the same as giving up on society; it was, in fact, more than ever, he wielded his power. Unburdened by personal and family matters, he rose to become the moral and intellectual guide of India at that time, giving voice to a grand vision which integrated Vedic wisdom, social ethics, and national consciousness (Yadav 2010, p. 118). His life was unfortunately ended by an assassination in 1926, but his memory as a reformer, educator, and nationalist is still alive. The switch to sanyasa is thus seen as the point in Munshi Ram's journey when his intellectual growth reached its peak and he was able to combine spiritual discipline and social activism to create a figure that had a revolutionary effect on the history of India in the modern times.

Political and Social Activism: Independence, Reform, Shuddhi & Sangathan (1917–1926)

After his sanyasa, Swami Shraddhanand redoubled his social and political activism. He became one of the most indomitable freedom struggle characters and reform movement's leaders in India. Between 1917 and 1926, he combined spiritual guidance with social activism, urging the necessity of moral purification alongside the awakening of the nation (Puri 2018, p. 125). To him, the return of moral and religious standards was the very foundation of India's self, respect as well as her political autonomy from the British (Sharma 1992, p. 84).

During this time, his Shuddhi movement was a significant undertaking that sought to regain those who had left Hinduism, in particular, Muslims and Christians, and bring them back to the Hindu fold. Swami Shraddhanand regarded Shuddhi not only as a method of revitalizing communal bonds but also as a way of regaining one's cultural heritage (Chandra 2003, p. 102). He was also equally committed to reform through education and urged the public to reject those evils alongside, among others, the practice of untouchability, child marriage, and gender oppression. By weaving the reinvigoration of religion with social issues, he envisioned the emergence of morally aware and socially responsible individuals (Singh 2015, p. 119).

Apart from Shuddhi, he was instrumental in the Sangathan movement which aimed to unite the different Hindu communities to band together against the colonial exploitation and be actively involved in the nationalist politics (Joshi 2008, p. 122). The leadership of Swami Shraddhanand in Sangathan showed his keen insight that political power and social unity went hand in hand and that religious reform could not only be an agent but also a rallying point for broader political mobilization (Yadav 2010, p. 136).

Also, Shraddhanand supported the Indian National Congress and other nationalist programs and used his clout to rally youth, educators, and communities to join the freedom struggle (Verma 2001, p. 79). His orations, articles, and groundwork were the main sources of a storm of participation in the freedom movement and of a feeling of collective responsibility for the nation's moral and political destiny. Resentfully, those who opposed his reformist and nationalist vision targeted him for elimination. In 1926, he was murdered, and thus his life's work was truncated, the work being the twin causes of social regeneration and national independence (Puri 2018, p. 140). However, his work during 1917, 1926 left an indelible mark, which serves as a record of how religious, educational, and political reforms could come about as one to level the social strata and, in effect, further the Indian struggle for social justice and freedom.

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Assassination and Martyrdom: Death and Immediate Impact (1926)

Swami Shraddhanand's engagement with society and politics ended very abruptly when, in 1926, he was murdered by a group of fanatics who were against his reformist and nationalist activities (Puri 2018, p. 147). His work in the Shuddhi movement, his fight against social inequity, and the unification of Hindus through his activism had brought him not only acclaim but also, quite possibly, controversy. The killing, therefore, created a huge ripple of shock and grief all over India among the reformists, educators, and nationalist leaders (Sharma 1992, p. 91).

The very first consequence of the event was deeply felt and also of great importance from a strategic point of view. The murder incited the followers of Arya Samaj, nationalist activists, and educators to adopt the path of Shraddhanand and carry on his mission with them; even more, they saw him as a martyr for social reform and national awakening (Chandra 2003, p. 118). However, the incident also puts a spotlight on the threats faced by the social reformers in the days of the British rule in India, especially those who dared to go against the religious orthodoxy and societal norms (Singh 2015, p. 128).

By dying for his cause, Shraddhanand's sacrifice was a powerful reminder of his ideals and from then on, he became a national icon of moral courage, educational vision, and patriotic service rather than only a regional reformer. His name lives on not only through Gurukul Kangri but also the Shuddhi movement and the wider nationalist movement, which is an inexhaustible source of inspiration for the following generations to commit themselves to social reform, education, and political engagement (Verma 2001, p. 88).

Intellectual Legacy and Historical Significance

Swami Shraddhanand was not only an educational reformer, a social activist, a religious guru, and a nationalist thinker during his life, but his influence was felt in all these areas even after his death. The main contributing factors to this lasting impact were his reconciliation of the Vedic knowledge with modern knowledge, which subsequently became the basis for his educational, social, and ethical approaches (Sharma 1992, p. 97). With the establishment of Gurukul Kangri University, he effectively created a school system that drew from ancient Sanskrit texts and contemporary disciplines, thus creating a student community that was holistically developed, morally upright, and conscious of the nation (Verma 2001, p. 92).

Not only Swami Shraddhanand's educational but also social reform writings were his major concerns, and he promoted among the people adherence to morality, rationality in the search for truth, and upholding our duties and rights as citizens. Their relevance is also unquestionable with the present-day debates regarding education and social ethics (Chandra 2003, p. 124). The issues that he raised in his talks, social equality, the fight against caste discrimination, women's education, ethical citizenship, are still very much alive in Indian schools, reformist movements, and the civil society and these constitute his ongoing legacy (Singh 2015, p. 136).

The integration of spirituality with activism is one of the aspects of Swami Shraddhanand's reform and religious philosophy that earned him a place in history. He showed that religious and ethical reform could not only involve the political engagement but also the building of the nation (Puri 2018, p. 152). The activities like Shuddhi and Sangathan through which he tried to unite people were not only the middle of the fight for freedom but, in his view, the very foundation of it. They also showed the link between moral rejuvenation and political power (Yadav 2010, p. 149).

In the final analysis, the journey of an intellectual life that is firmly based on the ground of action and where learning, ethical reflection, and public service intersect, is what Swami Shraddhanand's life stands for. In this way, he is one of the very few figures who played a pivotal role in bringing about modern history of India, and the story of how education, religious reform, and social activism can not only bring about societal transformation but also

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nurture leaders and inspire coming generations to strive for knowledge, morality, and national service is very much alive in him still (Joshi 2008, p. 135).

Conclusion

Swami Shraddhanand's life was a perfect example of his spiritual practice, social reform activities, and commitment to the nationalist cause, being firmly interlinked. His journey from Munshi Ram Vij, an enlightened, ethical and administratively experienced young man, to a sanyasi and reformist leader is a striking example of an intellectual and moral progression he made (Sharma 1992, p. 105). These were the methods by which he communicated with the people, and they were programs such as the Gurukul Kangri University, the Shuddhi movement, and the Sangathan campaigns through which he attempted to awaken people's moral consciousness, to induce social equality and to enhance national unity (Verma 2001, p. 97; Chandra 2003, p. 128). His murder in 1926 was a low point of history but, nevertheless, it raised him to the status of a martyr, thus, becoming a source of the following generations' spirit to continue the endeavors of education, ethical leadership, and social reform (Puri 2018, p. 158). Swami Shraddhanand's mind is a treasure that he kept in his heart the dream of a country where India would be a place where knowledge, morality, and civic responsibility would unite to form a society which was just, enlightened, and self, sufficient.

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THE GURU - SHISHYA PARAMPARA IN INDIAN KNOWLEDGE SYSTEM (IKS): PEDAGOGICAL BASES AND CONTEMPORARY RELEVANCE

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Abstract: In the Indian Knowledge system (IKS), The Guru - Shishya Parampara serve as the structural foundation for knowledge transmission. The lineage -based mentorship emphasis the combined development of student's ethical, cognitive, and practical talents rather than only a system of academic education or mechanical vocational training. This paper explores the philosophical foundation of Guru -Shishya model such as Shravana (focused listening), Manana (reflection), and Nididhyasana (meditation or experimental mastery) and describes how this framework was systematically interrupted during the colonial period. Finally, in alignment with Indian's National Education Policy (NEP) 2020, this study evaluates Contemporary framework for integrating the ancient lineage-based mentorship into modern technology-driven higher education to foster experimental, ethical and interdisciplinary learning.

Introduction

The excessive standardisation, transactional nature and intense emphasis on measurable economic results of contemporary global education system are being criticised more and more. Educational research has looked to the rich legacy of Indian Knowledge System (IKS) in quest of comprehensive alternatives**.** The Guru-Shishya Parampara, an unbroken lineage of knowledge transmission from teacher (Guru) to disciple (Shishya), is at the core of Indian Knowledge System. The Indian Knowledge System (IKS) represents one of humanity's most enduring intellectual traditions, encompassing millennia of accumulated wisdom across diverse domains including philosophy, mathematics, astronomy, medicine, linguistics, ethics, and ecological sciences (Kour and Singh, 2025). The National Education Policy (NEP) 2020 marks a watershed moment in India's educational history by explicitly mandating the integration of IKS into contemporary pedagogy, asserting that "education must build character and enable learners to be ethical, rational, compassionate, and caring, while at the same time preparing them for gainful employment" (Kour and Singh, 2025; Rani, 2024). The colonial disruption of indigenous knowledge transmission created what scholars' term "epistemicide"-the systematic erasure of non-western knowledge traditions (Chandel and Johnson, 2025; Kour and Singh, 2025). Macaulay's 1835 Minute institutionalised this marginalisation, establishing an educational paradigm that devalued Sanskrit-based knowledge systems and created what postcolonial theorists identify as an "inferiority mentality" regarding indigenous epistemologies (Admin, 2025; Kour and Singh, 2025).

The ancient Indian worldview sees education as a sacred process of self- realization, character building and cosmic alignment rather than just as the transmission of information. In order to address the broken of modern education, this paper explore how this antiquated approach can provide philosophical and structural insights.

Philosophical and Ontological Foundation

The main Indian philosophical systems especially Vedanta, Sankhya and Yoga are the foundation of the Guru- Shishya tradition. Knowledge (vidya) is divided into two areas in these traditions:

- **Apara Vidya:** Lower or secular knowledge, encompassing the sciences, grammar, arts**,** and economics.
- **Para Vidya:** Higher or indirect knowledge, leading to absolute truth and liberation (Moksha).

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Pedagogical Methodologies of Indian Knowledge System

The traditional Gurukul utilized a sophisticated, tried cognitive pedagogy that aligns remarkably well with modern mate cognitive framework like Bloom's Taxonomy.

Table 1: Flipped Learning Adaptation in the IKS Context

Traditional Element	Modern Translation	Implementation Challenge
Shravana (Listening)	Pre-class video lectures	Bandwidth constraints in rural areas
Manana (Reflection)	Online discussion forums	Low digital literacy among educators
Nididhyasana (Application)	In-class case simulations	Resistance to non-lecture pedagogy

The Triad of Learning: Shravana, Manana, and Nididhyasana

- **Shravana (Listening):** Shravana highly focused oral reception of text or teaching. Because Indian knowledge system was predominantly an oral culture, shravana trained an impeccable capacity for auditory memory and phonetic precision.
- **Manana (Reflection):** The intellectual processing of what was heard. Students were encouraged to question, debate and apply to logical tools (Tarka) to test the validity of the concepts.
- **Nididhyasana (Meditation):** The constant contemplation and experiential practice until knowledge become an inseparable part of the student's behaviour and consciousness.

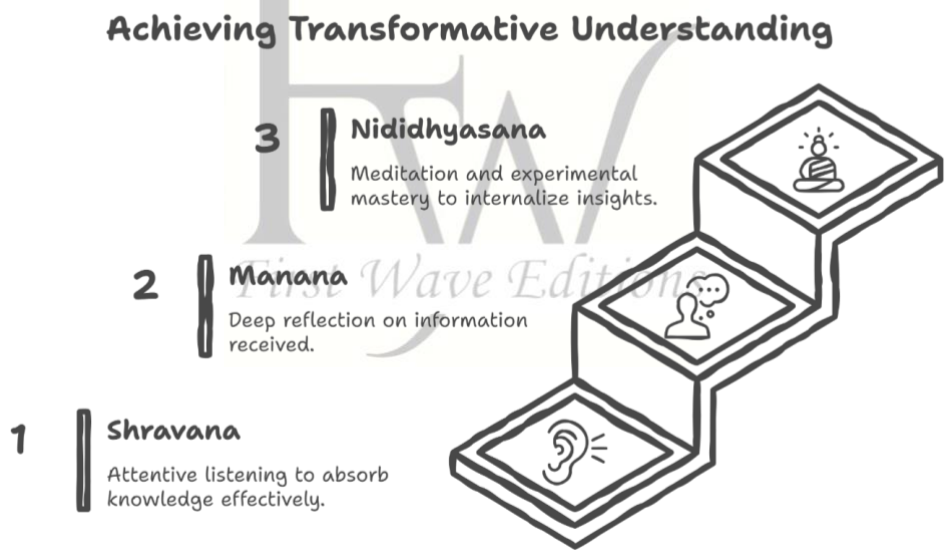

Figure 1: generated from Napkin

Experiential Externship

In practical sciences like 'Ayurveda' or 'Shilpa Shastra' learning was entirely experiential. This guaranteed that theory (shastra) and practice (prayoga) were never decoupled, fostering deep technical competency and creative mastery.

Historical Interruption

During the Colonial age, 'Lord Macaulay's Minute of Indian Education' (1835) served as a catalyst for the systematic marginalisation of the Guru- Shishya tradition. In order to create administrative clerks, the colonial authority purposefully destroyed the native Gurukul network and replaced it with a class room model from the industrial period.

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Table 2: Traditional vs Modern approach

Feature	Traditional Parampara	Modern / Colonial Model
Primary Objective	Character, growth, Liberation	Employability, utility
Place of Learning	Individualized, mastery- based	Standardized, time bound
Evaluation	Continuous observation	Quantitative testing

Contemporary Relevance and NEP 2020

Indian Knowledge System integration at all the education levels is specifically required by NEP 2020. Universities are implementing a number of new frameworks to operationalise the Guru- Shishya ethos:

- **Faculty Mentor Model:** Moving from academic advising to structured comprehensive mentorship.
- **Blended Pedagogy:** Utilizing digital platforms for synchronous master classes while maintaining the personal mentor connection.

Table 3: Integration Models in Contemporary Education

IKS Domain	Traditional Sources	Modern Integration	Educational Benefits
Linguistics	Panini's Ashtadhyayi	Natural language Processing	Meta-linguistic awarenes
Arts	Natyashastra, Silpa shastras	Arts-integrated learning	Creative expression
Ethics	Dharma shastras, Jataka tales	Value education frameworks	Moral reasoning development
Mathematics	ShulbaSutras, Baishali Manuscript	Vedic mathematics modules	Enhanced computational fluency
Medicine	Charaka Samhita, Sushru Samhita	Integrative health courses	Holistic health perspective
Ecology	Vrikshayurveda, Sacred groves	Sustainable agriculture Programs	Environmental consciousness

Conclusion

The Guru- Shishya Parampara is much more than a legacy of the ancient history of India. It is a living educational model that offers substantial solutions to the limitation of the modern mass education. In this chapter the researcher has tried to show that Parampara is not just a transmission of knowledge, but a transformation of identity. This approach is founded on the basis principles of intentional mentorship, experimental learning, dialogic inquiry, ethical education and the much-needed development of an open student mind, which is in stark contrast to the split, exam oriented and often context less approach to nature of modern pedagogy. In this study the researcher showed that central genius of this tradition is its recognition of two truths: first, that knowledge is not a commodity to be transferred but a reality to be realised; and second, that the relationship between the knower and the know is mediated by the quality of the human bond between the Guru (the dispeller of darkness) and the Shishya (the devoted learner). The Parampara reminds us that in the age of digital learning, artificial intelligence, standardised curricula, attention patience, humanity and individualised feedback are not outdated virtues but essential cognitive and ethical prerequisites for deep learning.

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YOGA AND MEDITATION PRACTICES IN ANCIENT INDIA; A STUDY OF INDIAN KNOWLEDGE SYSTEM

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Abstract: One of the oldest, most extensive, and enduring intellectual traditions in human history, the Indian Knowledge System (IKS) spans a broad spectrum of disciplines such as philosophy, science. medicine, education, and spirituality. Among its most significant contributions are yoga and meditation, which emerged in ancient India as essential elements of a holistic path to human well-being and self-realisation. The purpose of this research is to comprehend traditional Indian yoga and meditation practices. Yoga represents the harmonious integration of body, mind, and spirit. The related practice of meditation focuses on cultivating inner awareness, attention, and mindfulness. In ancient India, these activities were not merely mental or physical exercises; they were central to the quest for liberation and elevated awareness (Moksha). The Intellectual roots of yoga and meditation are closely tied to philosophical traditions such as Samkhya and Vedanta, which have played a vital role in shaping the spiritual and cultural identity of Indian society. These philosophical perspectives emphasize the essence of reality, the self, and awareness.

Introduction

Indian Knowledge System (IKS) represent a vast collection of traditional wisdom, practices, and cultural understandings that have developed over centuries within particular Indian communities. These systems are grounded in the harmonious connection between individuals and their natural and spiritual surroundings (Pathan and Sharma, 2025). IKS includes a broad spectrum of knowledge such as traditional practices, beliefs, oral traditions, and ecological wisdom that is distinctive to particular cultural groups (Warren et al., 1995). Yoga and meditation, which originated in India, have become widely popular around the world for enhancing physical and mental well-being (Khan and Deshpande, 2024).

Indian traditional knowledge is grounded in ancient philosophical ideas that view mental health as inseparable from individual development and community growth, and it regards these rights as fundamental human rights (Jonsson et al., 2020). Yoga and Ayurveda practices have attracted considerable global attention, as they are regarded as vital to the wellness industry. Western observers consider Indian yoga an eternal tradition based on sacred Vedic scriptures and ancient divine messages that provide comprehensive mind-body spiritual guidance (Wig, 1990; White, 2011:1). Historically, yoga and meditation evolved through various stages, including the Vedic period, the ascetic traditions of Buddhism and Jainism, and the classical synthesis presented by the sage Patanjali. These traditions collectively contribute to a rich body of knowledge that integrates ethical conduct, physical discipline, breath control, and mental concentration. The emphasis on practices such as asana (postures), pranayama (breathing techniques), and dhyana (meditation) reflects a systematic methodology aimed at achieving physical health, mental clarity, and spiritual awakening. By situating yoga and meditation within the broader framework of the Indian Knowledge System, this study endeavours to provide a comprehensive understanding of their enduring legacies and contemporary significance.

Conceptual Framework of Yoga

Etymologically, as per India's oldest scripture, the Rig-Veda, the term yoga derives from Sanskrit yuj, meaning "to yoke, join, unite," commonly interpreted as the union of individual consciousness with a universal or highest self. Classical texts describe yoga as the control or cessation of the mind's wandering thought (citta-vritti-nirodha), which

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results in self-realisation and freedom. Contemporary philosophical syntheses portray yoga as an all-encompassing framework for conscious transformation, blending physical, mental, and spiritual growth. Originally thought of as a harness on an animal's neck used to pull a cart, the term later broadened to encompass a military apparatus. According to White, the term "yoga" during wartime contrasts with "Skema" in peacetime. Yoga is understood as a deliberate endeavour intended to attain what has remained unachieved in spiritual life. The first known reference to the term "yoga" appears in the Rig Veda, the oldest Hindu sacred text. The wisdom found in the Rig Veda was further expanded and refined by seers in another sacred text, the Upanishads (Sarathe, 2021). Yoga is both an art and a science of living (Kusuma, 2016).

"Yoga" has a wider range of meanings than nearly any other word in the Sanskrit lexicon. The act of yoking an animal, as well as the yoke itself, is called yoga. In astronomy, a conjunction of planets or stars, as well as a constellation, is called yoga. When one mixes together various substances, it can also be called yoga. The word yoga has also been employed to denote a device, recipe, method, strategy, charm, incantation, fraud, trick, endeavour, combination, union, arrangement, zeal, care, diligence, industriousness, discipline, use, application, contact, sum total, and the work of alchemists. However, this is not an exhaustive list. (White, 2011: 2).

Conceptual Framework of Meditation

The term meditation is translated from the Sanskrit term, Dhyāna. Dhyāna has the root verb dhyai (dhyāyati), meaning to think of, imagine, contemplate, meditate on, or call to mind. Meditation is translated from Jhāyana or Jhāna in the Pali literature. has the same meaning as above. According to Buddhist scriptures, meditation is necessary for mental growth and purity of mind. What is the meaning (Artha) of the word dhyāna? Because of meditation (dhyāna), practitioners are "concentrated" (samāhita) and capable of contemplating the object (upanidhyāna). Upanidhyai signifies "to contemplate exactly." The root dhyai is used in the sense of upanidhyāna. The term "meditation" comes from the Latin word "meditari," meaning "to actively engage in contemplation or reflection." In another source, the term "meditation" comes from the common Greek and Latin root of the term "medicine." Meditation is a well-defined and unique experience marked by a state of "thoughtless awareness" or mental silence (Sharma and Sharma, 2024). Meditation is defined as a mind–body practice involving intentional mental activities, such as focusing, releasing, imagining, moving, directed toward an object or field of experience, often becoming more effortless over time. Meditation is the practice of engaging in mental exercises to achieve a higher level of spiritual awareness (Clarke et al., 2018).

Yoga in Ancient India

In ancient India, yoga was not merely a physical exercise but a complete lifestyle. These included moral values, self-discipline, breathing techniques, concentration, and spiritual practices. The most systematic explanation of yoga was provided by Sage Patanjali in the Yoga Sutras. He described the Ashtanga Yoga or Eightfold Path of Yoga, which includes the following:

- **Yama:** moral principles.
- **Niyama:** personal discipline.
- **Asana:** Physical postures.
- **Pranayama:** Breathing control.
- **Pratyahara:** Withdrawal of the senses.
- **Dharana:** Concentration.
- **Dhyana**: Meditation.
- **Samadhi:** A state of spiritual absorption or enlightenment.

These practices are designed to promote physical fitness, mental balance, and spiritual freedom
Yoga equips students with tools to enhance their social and emotional well-being, promoting holistic growth that helps navigate the challenges of student life (Sahu, 2024). Yoga began in India over 5000 years ago. It is an ancient practice designed to bring balance to the body, mind, and sprit. Yoga likely began during the Vedic era in India,

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roughly around 1500BCE. At that time, yoga was chiefly employed as a religious practice and was closely associated with Hinduism and Buddhism. Dating to around 1500BCE, The Rig Veda contains the earliest known form oof yoga, making it undoubtedly one of Hinduism's oldest sacred texts. The IKS encompasses yoga and meditation, practices known for their broad impact on emotional, psychological, and spiritual well-being. Yoga originated from the Vedas and Upanishads, two ancient Indian scriptures. As a foundation of IKS, it has remained largely unchanged over the centuries (Feuerstein, 2003).

Nirodhayoga (yoga of cessation), an early form of yoga, is described in the Mokshadharma section of the 12th chapter (Shanti Parva) of the third century BCE Mahabharata (James and Mark, 2017). The origins of yoga can be traced back to the Indus Valley Civilization, one of the oldest civilizations in the world, which flourished around 3300–1300 BCE, where archaeological findings suggest the presence of seals depicting figures in yogic postures (Kenoyer, 1991; Harvey, 2012). Archaeological excavations at sites such as Mohenjo-Daro and Harappa have unearthed seals and artifacts depicting figures in yogic postures, suggesting the presence of early yogic practices in ancient Indian society (Chauhan & Bansal, 2019). The Upanishads, philosophical treatises dating back to around 800–200 BCE, delve deeper into the essence of existence, the individual self (Ātman), and the universal aim of human existence—freedom (moksha) (Egenes 2023). Additionally, references to yoga can be found in ancient Indian texts such as the Rigveda, the oldest of the Vedas, dating back to approximately 1500 BCE, where the term "yoga" is mentioned in the context of spiritual discipline and meditation. (Feuerstein, 2012). Yoga, deeply rooted in the Indian Knowledge System (IKS), is a profound discipline that integrates physical, mental, and spiritual well-being (Sharma and Tiwari, 2024). Born in India, yoga an ancient practice has recently earned global recognition for its wide-ranging health benefits and holistic approach to well-being. However, to grasp the true essence of yoga, one must explore its origins in ancient Indian tradition.

Meditation in Ancient India

Meditation holds an important place in Hinduism, Buddhism, and Jainism. Ancient sages meditated in remote locations to achieve greater awareness and insight. Various meditation practices were undertaken, including;

- **Mantra Meditation:** The repetitive chanting of sacred sounds like "Om."
- **Breath Meditation:** Concentrating on your breathing rhythm.
- **Mindfulness Meditation:** Being aware of one's thoughts and actions.
- **Transcendental Meditation:** Reaching profound relaxation and inner stillness.

Buddha achieved enlightenment by meditating deeply beneath the Bodhi tree, an experience that formed the basis of Buddhist philosophy. Jain monks also engage in rigorous meditation and self-discipline as part of their spiritual purification. The Upanishads, thought to have been composed between the 8th and 4th centuries BCE, also discuss meditation and breathing exercises. Meditation plays a vital role in numerous Indian philosophical and spiritual systems, such as Jainism and Buddhism, and traces its origins to Vedic scriptures. Examples of meditation include mindfulness meditation (Vipassana), mantra meditation (Repeating sacred sounds), and transcendental meditation. Meditation offers an effective method to soothe the mind, focus on the present moment, and cultivate mindfulness (Nash, 2019). Mindfulness meditation traces its roots to the earliest recorder forms of yogic meditation in the Vedas (Sharma, 2015). Meditation is among the oldest spiritual practices in ancient India and China. Meditation has been practiced for thousands of years in India and China, with various techniques documented in ancient texts. In ancient India Vedic texts, meditation was described as beginning with dhāraṇā (concentration) and progressing to dhyana (meditation). The primary purpose of meditation in Vedic scriptures is to purify the mind and understand the knowledge of the ultimate reality, which is the means of obtaining the highest freedom (Zanyi et al. 2022). In ancient India, meditation began as a special practice mentioned in Vedic texts, coexisting with the comprehensive health system of Ayurveda. Meditation, with its ancient roots and evolving forms, is a timeless, bringing calmness in the midst of turmoil. It transcends individual boundaries, connecting people globally and fostering a shared sense of well-being. It serves as a special thread that unites humanity and invites everyone to partake in its transformative journey toward inner peace.

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Yoga and meditation have mental health and psychological benefits

Yoga and meditation are ancient techniques that encourage balance in the body, mind, and sprit. These traditions, which originated in ancient India, have become widely acknowledged around the world the world due to their favourable impact on mental health and well-being. In today's fast-paced and hectic world, people frequently experience anxiety, despair, emotional imbalance, lack of attention, and mental tiredness. Yoga and meditation are natural and effective techniques to treat these issues and promote overall well-being. Mental health is an important part of human well-being. It influences how people think, feel, behave, and deal with everyday issues. Good mental health enables people to maintain positive relationships, make sound decisions, and deal with stress successfully. Yoga and meditation improve mental health by promoting inner serenity, emotional stability, and mental clarity.

Yoga is a comprehensive practice that involves physical postures (asanas), breathing exercises (pranayama), and relaxation techniques (asanas). These techniques promote blood circulation, calm the neurological system, and relive physical tension, in the body. Regular yoga practice decreases the production of stress hormones like cortisol, which alleviates anxiety and stress. It also improves sleep quality, boosts energy levels, and promotes a state of calm and happiness.

Meditation is the practice of focusing on the mind and developing awareness. It trains individuals to stay present and control unnecessary thoughts and feelings. Through meditation, people learn to observe their feelings without becoming overwhelmed. This helps reduce negative thinking, emotional instability, and mental stress. Meditation also improves concentration, memory, creativity, and decision-making.

One of the primary psychological benefits of yoga and meditation is stress reduction. Stress is a frequent problem in today's culture, particularly among students, professionals, and the elderly. Continuous stress can cause mental and physical health concerns. Yoga and meditation help people calm their minds and bodies, helping them to deal with obstacles more successfully. These activities also boost emotional resilience, allowing people to stay calm under challenging times.

Another significant advantage is a reduction in anxiety and despair. Many scientific studies have found that practicing yoga and meditation on a daily basis can improve mood and mental health. Deep breathing techniques and mindfulness activities promote calmness and confidence. As a result, people become more emotionally stable and cheerful.

Yoga and meditation encourage self-awareness and discipline. They encourage people to better comprehend their thoughts, feelings, and behaviours. This greater awareness promotes positive attitudes, healthier practices, and improved interpersonal interactions. Students who practice yoga and meditation frequently demonstrate enhanced concentration, academic performance, and emotional control.

Furthermore, yoga and meditation improve social and psychological well-being by encourage compassion, patience, and optimistic thinking. These activities assist people develop inner strength and mental calm, which are necessary for living a healthy and fulfilling life.

Conclusion

Yoga and meditation are ancient Indian practices that provide significant physical, mental, and spiritual benefits. Individuals can improve their health, find inner peace, and get a better understanding of themselves and the world by following these practices. These ancient philosophy-based practices remain relevant and transformative in current life, providing methods for reaching balance and harmony. Yoga and meditation are now widely recognised for their therapeutic, psychological, and lifestyle advantages. However, their origins and

deeper philosophical importance within the Indian Knowledge System are frequently left unexamined. This study examines the historical evolution, philosophical foundations, and practical dimensions of yoga and meditation in ancient India.

It seeks to demonstrate how these practices were conceived as holistic tools for personal change and societal harmony, as well as how their significance continues to reverberate in addressing contemporary stress, health, and well-being concerns. Yoga and meditation are powerful tools for maintaining mental health and psychological wellbeing. They reduce stress, anxiety, and depression, while improving concentration, emotional stability, self-confidence, and overall happiness. In the modern world, where mental health challenges are increasing rapidly, yoga and meditation serve as effective and natural methods for achieving a healthy and peaceful lifestyle.

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VEDIC ROOTS OF ECONOMIC THOUGHT

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Abstract: This paper explores the economic dimensions embedded within the Four Vedas—Rigveda, Yajurveda, Samaveda, and Atharvaveda - through a textual and analytical study of selected mantras. The study highlights various aspects of Vedic economic life, including agricultural production, cattle wealth, trade, labour specialization, navigation, wealth accumulation, economic ethics, and social welfare. Particular attention has been given to concepts such as productive labour, resource management, commercial exchange, debt repayment, and collective prosperity, which reveal an advanced socio-economic consciousness in Vedic society. The paper further examines how religious practices were closely interconnected with material well-being and economic organization. By analyzing economic references scattered throughout the Vedic hymns, the study attempts to demonstrate that the Vedas preserve some of the earliest foundations of Indian economic thought and provide valuable insights into the socio-economic structure of ancient India.

Introduction

The Four Vedas—Rigveda, Samaveda, Yajurveda, and Atharvaveda—occupy a distinguished position as the earliest repositories of knowledge in Indian civilization. Although the Vedas are generally regarded as the foundation of religious and spiritual literature, they also provide a vivid picture of the economic life of ancient Indian society. Various aspects of agriculture, animal husbandry, trade, crafts, medicine, wealth, navigation, administrative organization, and occupational division of labour are found scattered throughout the Vedic hymns.

The economic foundation of Vedic society primarily rested upon agriculture and cattle-rearing. Consequently, repeated prayers were offered to the deities for food, fertile land, cows, horses, and material prosperity. At the same time, references to merchants, carpenters, chariot-makers, physicians, householders, and military leaders indicate the gradual development of specialization of labour and economic organization within society. Mentions of river routes, maritime journeys, and the exchange of goods further suggest the existence of an early system of trade and commerce. Likewise, references to institutions such as the Sabhā, Samiti, the king, and the Grāmaṇī (village chief) provide evidence of the growth of social and political administration.

Thus, beneath the religious and liturgical framework of the Vedic hymns, one can discern the reflection of a well-structured economic system in ancient India. Therefore, Vedic literature holds immense significance as an authentic and valuable source for the study of the history of Indian economic thought.

Rigveda

The hymns of the Rigveda provide a vivid reflection of the economic and social life of the Vedic age. Alongside religious worship and ritualistic practices, the text contains numerous references to agriculture, cattle-rearing, trade, crafts, medicine, navigation, wealth, administration, and occupational division of labour, thereby revealing the existence of a well-organized economic system. Food, land, cattle, and wealth were regarded as the principal means of livelihood, and repeated prayers were offered to various deities for prosperity, nourishment, and social welfare. Hence, the Rigvedic hymns are not merely religious compositions; they also serve as valuable records of the economic realities of the Vedic period.

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Agriculture constituted the principal foundation of the Vedic economy. The mantra "अक्षैर्मा दीव्यः कृषिमित् कृषस्व वित्ते रमस्व बहुमन्यमानः"[1] advises people to abandon gambling and engage in agriculture, thereby establishing farming as a stable and honourable occupation. Similarly, the mantras "सीरा युगा तनुध्वं कृते योनौ वपतेह बीजम्", "शुनं नः फाला अभि भूमिं कृशन्तु", "शुनं वाहाः शुनं नरः", and "शुनासीरा विमां वाचं जुषेथाम्"[2] contain prayers for successful ploughing, sowing of seeds, and agricultural prosperity. In the mantra "सीता नः सुभगा भव"[3] , the earth is personified as a benevolent goddess, while "उर्वरापते मधुमन्तमूर्मिं धेनुरिव पयो अस्मासु धुक्ष्व"[4] compares fertile land to a nourishing cow. These references clearly indicate that agricultural production formed the backbone of the Vedic economy.

The importance of food grains is also emphasized in several hymns. In "अन्नपतेऽन्नस्य नो देहि"[5] , direct prayers are offered for food. The mantra "ऊर्जं नो धेहि द्विपदे चतुष्पदे"[6] seeks nourishment for both humans and animals. References to barley appear in "यवं वृकेण चर्षणीः"[7], while "करम्भ ओषधे भव"[8] suggests the preparation of food substances. The mantra "पुरोडाशं नो अन्धसः"[9] refers to sacrificial food offerings. These passages demonstrate that food production and grain cultivation were essential pillars of economic stability.

Cattle-rearing constituted another major component of the Vedic economy. Cows were regarded as the chief symbols of wealth and prosperity. The mantras "गावो भगो गाव इन्द्रो मे अच्छान्" and "गावः सोमस्य प्रथमस्य भक्षः"[10] glorify the importance of cows. In "यूयं गावो मेदयथा कृशं चित्"[11] , cows are praised for their nourishing qualities. The mantra "दुहामश्विभ्यां पयो अघ्न्येयम्"[12] extols the milk of the inviolable cow, while "मा गामनागामदितिं वधिष्ट"[13] condemns cow slaughter. These references reveal that cattle possessed both economic and religious significance in Vedic society.

The importance of horses is likewise noteworthy. In "अश्वस्य शीर्षा"[14] , the power and grandeur of the horse are celebrated. The mantra "मा नो अश्वा अनमीवास ईषत"[15] prays for the health and well-being of horses. Horses served as important means of warfare, transportation, and trade. Other animals are also mentioned in mantras such as "अजा इव पश्वः"[16], "ऊर्णावती युवतिः"[17] , and "वृषभश्चर्षणीनाम्"[18]. Thus, animal husbandry played a significant role not only in food and dairy production but also in the broader economic structure.

[1] Ṛgveda 10.34.13
[2] Ṛgveda 4.57.5
[3] Ṛgveda 4.57.6
[4] Ṛgveda 4.57.8
[5] Ṛgveda 1.187.10
[6] Ṛgveda 1.187.9
[7] Ṛgveda 1.117.21
[8] Ṛgveda 3.52.7
[9] Ṛgveda 1.162.3
[10] Ṛgveda 6.28.1
[11] Ṛgveda 6.28.6
[12] Ṛgveda 1.164.27
[13] Ṛgveda 8.101.15
[14] Ṛgveda 1.163.2
[15] Ṛgveda 1.162.21
[16] Ṛgveda 1.162.2
[17] Ṛgveda 10.26.6
[18] Ṛgveda 4.58.3

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The Rigveda also reflects the considerable development of crafts and industries. The mantra "तक्षाणं विश्वरूपम्"[19] refers to carpentry and craftsmanship. "सूचीभिः शिम्यन्तु" (Ṛgveda 10.85.7) suggests the existence of sewing practices. The weaving industry is indicated in "तन्तुं तन्वन्" (Ṛgveda 10.130.1). Leatherwork is reflected in "चर्मणा पृथिवीं दधे" (Ṛgveda 5.85.5), while "वपा तक्षति" (Ṛgveda 10.72.2) points to carving or metal craftsmanship. Particularly significant is the mantra "रथकारो अश्वकारः"[20] , which mentions chariot-makers and horse-trainers. These examples demonstrate that occupational crafts and industries had attained an organized form in Vedic society.

The concept of occupational specialization and social organization is also clearly visible in the Rigveda. The mantra "कारुरहं ततो भिषक्" (Ṛgveda 9.112.3) refers to poets, physicians, and other professionals. Medical knowledge is reflected in "भिषजा भेषजेभिः" (Ṛgveda 1.116.16). References to priests and sacrificial functions occur in "पुरोहितं यज्ञस्य" and "होता नो अध्वरस्य" (Ṛgveda 1.12.1). Intellectual and literary activities are emphasized in "गायत्रेण प्रति मिमीते अर्कम्" (Ṛgveda 1.164.24), "छन्दोभिर्यज्ञमायतन्" (Ṛgveda 9.97.9). These references indicate that knowledge-based professions enjoyed considerable prestige in Vedic society.

Important information regarding trade and wealth is also found in the Rigveda. The mantra "इन्द्रमहं वणिजं चोदयामि" (Ṛgveda 3.15.1) refers to merchants and commercial activity. In "शुनं नो अस्तु प्रपणो विक्रयश्च" (Ṛgveda 4.24.9), prayers are offered for successful buying and selling. The desire for wealth and prosperity is expressed in "द्रविणोदा द्रविणसस्पतिः" (Ṛgveda 1.15.7), "भगं धियं उदव ददानः"[21] , and "रयिं नः चित्रमश्विनम्" (Ṛgveda 1.46.2). These passages suggest that wealth was regarded as a major indicator of social prestige and economic stability.

Navigation and transportation systems had also developed considerably during the Vedic age. The mantras "नावा मतीनां यातं पाराय" (Ṛgveda 1.46.7), "शतारित्रां नावम्" (Ṛgveda 1.116.3), and "अरित्रं वां दिवः पृथु" (Ṛgveda 1.116.4) refer to boats, navigation, and riverine transport. These references indicate that water-based trade and communication formed an important component of the Vedic economy. Rivers served as important channels connecting different settlements and facilitating the exchange of goods.

The Rigveda also presents clear evidence of political and administrative organization. The mantra "सभा च मा समितिश्च" (Ṛgveda 10.34.6) refers to the 'Sabhā' and 'Samiti', institutions associated with political deliberation and governance. References to rulers and administrative officers occur in "राजानं चर्षणीनाम्" (Ṛgveda 8.70.1), "सम्राजं चर्षणीनाम्" (Ṛgveda 1.126.2), "ग्रामणीः" (Ṛgveda 10.62.11), and "सेनानीर्नः" (Ṛgveda 9.96.6). Family-based economic organization is reflected in "गृहपतिश्च नो दमे" (Ṛgveda 7.15.2) and "दम्पती समनसा" (Ṛgveda 1.185.1). Furthermore, concerns regarding theft and protection of property appear in "स्तेनासो ये च तस्कराः" (Ṛgveda 7.104.24) and "मा वः स्तेन ईशत" (Ṛgveda 1.42.2). These references demonstrate that the protection of wealth and social security were considered important aspects of Vedic economic life.

Thus, the hymns of the Rigveda contain multidimensional discussions on agriculture, cattle-rearing, food production, crafts, trade, transportation, medicine, administration, and wealth. Beneath their religious framework, these hymns reflect a realistic picture of life and reveal the existence of a well-organized

[19] Ṛgveda 10.81.3
[20] Ṛgveda 9.112.2
[21] Ṛgveda 7.41.2

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economic structure in Vedic society. Therefore, the Rigveda occupies a position of great importance as one of the earliest and most valuable sources for the study of ancient Indian economic thought.

Yajurveda

The mantras of the Yajurveda present a realistic and vivid reflection of the economic consciousness of Vedic society. Alongside religious rituals and sacrificial practices, the text expresses deep concern for daily life, an agriculture-based economy, cattle-rearing, trade, wealth, gold, strength, and social prosperity. Food, cows, horses, land, and wealth were regarded as indispensable elements of human livelihood, and therefore repeated prayers were offered to the deities for prosperity, nourishment, and abundance. Within these hymns, the foundational principles of ancient Indian economic thought are clearly reflected.

Food and nourishment were conceived as the primary sources of life and vitality. In the mantra "ऊर्जं च मे यज्ञेन कल्पताम्"[22] (Yajurveda 18.11), a prayer is offered for 'ūrjā' or nourishing energy. Here, the term 'ūrjā' signifies not merely food, but also vitality and productive power. The mantra "ईषं च मे" (Yajurveda 18.9) seeks food and the means of sustenance. Similarly, "ऊर्जं नो धेहि द्विपदे चतुष्पदे"[23] prays for nourishment for both humans and animals, while "ऊर्जं चित्रावस्तम्"[24] expresses the desire for abundant and varied prosperity. In "मयि देवा द्रविणमा यजन्ताम्" (Yajurveda 7.46) and "अस्मासु द्रविणं धत्त"[25] , prayers are offered to the gods for wealth and the means of livelihood. These references clearly demonstrate that food production and nourishment were regarded as the principal foundations of economic stability.

The agricultural basis of society is also prominently reflected in the Yajurveda. The mantra "माता भूमिः" (Yajurveda 12.12) personifies the earth as a mother. This is not merely a poetic metaphor but a profound recognition of agrarian life. In "पृथिवीं दृढ" (Yajurveda 12.29), prayers are offered for the stability and fertility of the earth. The mantra "सुम्नायनी पृथिवी" (Yajurveda 12.63) describes the earth as benevolent and auspicious. The importance of forest and tree resources is reflected in "ये वृक्षाणाम्" (Yajurveda 8.37), while "कृष्यै त्वा" (Yajurveda 18.45) directly indicates agricultural activity. These references reveal that land, trees, and agricultural production constituted the primary basis of economic life.

The importance of cattle-rearing is likewise strongly reflected in the economic thought of the Yajurveda. Cows were regarded as the foremost symbols of wealth and prosperity. In "गव्यं नः" (Yajurveda 13.44), prayers are offered for cattle wealth. "गोभिः संनद्धम्" (Yajurveda 13.40) expresses the desire for prosperity enriched with cows, while "गवां पोषेण" (Yajurveda 8.28) prays for the nourishment and increase of cattle. The mantra "बहु गोधनम्" (Yajurveda 17.84) seeks abundant cattle wealth, and "गावः पिन्वन्तु" (Yajurveda 18.39) expresses the desire for milk-yielding cows. Likewise, "सा नो पयस्वती दुहाम्"[26] invokes the image of a cow overflowing with milk. Cows were sources of milk, clarified butter, and curd, and they also played a vital role in agriculture and sacrificial rituals. Thus, cattle wealth represented one of the chief indicators of economic power in Vedic society.

[22] Yajurveda 18.11
[23] Yajurveda 11.83
[24] Yajurveda 11.62
[25] Yajurveda 17.68
[26] Yajurveda 18.24

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The significance of horses is equally noteworthy. The mantra "वाजिनीवती" (Yajurveda 8.16) praises horse-rich prosperity, while "अश्वावतीः" (Yajurveda 8.76) refers to wealth accompanied by horses. In "अश्वस्य धावतः" (Yajurveda 6.16), the speed and strength of the horse are glorified. The mantra "वाजश्च मे" (Yajurveda 18.13) expresses the desire for strength and vigorous prosperity. In Vedic society, horses served as important means of warfare, transportation, and commercial communication. Consequently, horse wealth symbolized both political authority and economic strength.

The aspiration for wealth is deeply reflected in numerous mantras. In "रायस्पोषेण सं सृज" (Yajurveda 18.37), prayers are offered for prosperity and material abundance. "रायस्पोषमस्मासु धेहि"[27] seeks the establishment of wealth and nourishment among the people, while "रायस्पोषाय त्वा" (Yajurveda 4.9) invokes the growth of prosperity. The mantra "द्रविणं च मे" (Yajurveda 18.10) contains a direct prayer for wealth. In "बृहस्पतिर्नः परिपातु पश्चात्"[28] , protection and welfare are sought from Bṛhaspati, while "विश्वतो नः सुविताय"[29] (Yajurveda 22.29) prays for well-being and prosperity from all directions. The mantra "सहस्रपोषं दधातु" (Yajurveda 17.46) expresses the aspiration for thousandfold prosperity. Through terms such as 'rāyi', 'draviṇa', and 'poṣa', these hymns reveal the concepts of wealth, property, and economic power.

The importance of gold and precious metals is also significant. In "चन्द्रं रायिं सुवर्णम्" (Yajurveda 4.24), gold is presented as a symbol of splendour and prosperity. The mantra "हिरण्यं च मे" (Yajurveda 18.19) directly prays for gold, while the expression "हिरण्यवर्णाः" (Yajurveda 34.21) reflects the brilliance and magnificence associated with it. Gold served as a major medium of ornamentation, sacrificial utility, and accumulation of wealth. These references indicate the development of a metal-based economic consciousness.

Commercial mentality and trade activities are likewise evident in the Yajurveda. The mantra "इन्द्रमहं वणिजं चोदयामि" (Yajurveda 9.50) contains a significant reference to merchants and commerce. In "धनेन धनमिच्छमानः" (Yajurveda 10.32), the desire to acquire further wealth through existing wealth is clearly expressed. The mantra "शुनं नो अस्तु प्रपणो विक्रयश्च"[30] prays for successful buying and selling, while "शुनं नो अस्तु चरित्रम्"[31] seeks safety and success in commercial journeys. These references clearly indicate that exchange, trade, and mercantile activities formed important aspects of the Vedic economy.

Special importance was also attached to strength, vigour, and efficiency. In "बलं च मे" (Yajurveda 18.15), prayers are offered for physical strength, while "सहश्च मे" (Yajurveda 18.14) seeks endurance and resilience. The mantra "ओजो मे" (Yajurveda 18.22) invokes vital energy, and "वीर्यं च मे" (Yajurveda 18.37) expresses the desire for courage and productive capacity. Labour power was indispensable in agriculture, cattle-rearing, and social life; therefore, strength and efficiency were regarded as essential foundations of economic prosperity.

Thus, the mantras of the Yajurveda reflect multidimensional ideas relating to food, agriculture, land, cattle, horses, wealth, gold, trade, strength, and social prosperity. Beneath the religious framework of these hymns,

[27] Yajurveda 17.36
[28] Yajurveda 4.37
[29] Yajurveda 22.29
[30] Yajurveda 30.22
[31] Yajurveda 30.23

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one can clearly perceive the production system of an agrarian society, the concept of wealth, commercial mentality, and the aspiration for a prosperous life. Consequently, the Yajurveda occupies a distinguished place as an authentic and valuable source for the study of ancient Indian economic thought.

Samaveda

Agriculture, cattle-rearing, and wealth-centered social organization constituted some of the principal foundations of the economic life of the Vedic age. Numerous mantras of the Samaveda reflect not only religious worship but also the practical struggles of human life, including concerns for food production, cattle wealth, horses, gold, strength, security, and social prosperity. The economic consciousness reflected in these hymns is not merely materialistic; rather, it is intimately connected with religion, society, and collective welfare. Consequently, repeated prayers were offered to the deities for food, wealth, cattle, and happiness.

Food was conceived as the primary basis of human existence. In the mantra "अन्ने स्वर्भवो मयः"[32], it is declared that happiness, joy, and welfare reside in food itself. Here, food is regarded not merely as sustenance but as the principal force sustaining life. Again, in "अन्न ओ भूमसि पर घृतमयम्"[33] , food is described as nourishing like clarified butter (*ghṛta*), thereby emphasizing its purity and nutritive value. The mantra "अन्नस्य नो देहि" (Sāmaveda 873) contains a direct prayer for food, while "अन्नम् बहु कृणुहि" (Sāmaveda 901) expresses the desire for abundant grain production. These references clearly indicate that food supply formed the central basis of economic security. The conception of food in the Samaveda thus reflects the agrarian realities of Vedic society.

The relationship between nature and agrarian economy was extremely profound. In "यथा न वसवस्कृतिः" (Sāmaveda 836), aspirations for fertility and agricultural prosperity are expressed. The mantra "पर्जन्यो वृष्टिमावहत्"[34] invokes the rain-god for sufficient rainfall, recognizing that agricultural production was impossible without rain. In "शं नो भूमिः" (Sāmaveda 943), prayers are offered for the earth to become auspicious and fertile. The mantra "द्यौः पिता पृथिवी माता"[35] personifies heaven and earth as father and mother, reflecting a deep awareness of nature-dependent agricultural life. Likewise, "सुक्षेत्रिया सुगातुया" (Sāmaveda 1512) expresses the desire for fertile fields and a prosperous life. These prayers demonstrate that agriculture formed the backbone of the economic structure and that favourable natural conditions were essential for production.

Cattle-rearing was likewise an indispensable aspect of economic life. Cows, in particular, were regarded as the foremost symbols of wealth and prosperity. In "गवां पोषम्" (Sāmaveda 1284), prayers are offered for the nourishment and increase of cattle. The term 'poṣa' signifies not merely numerical growth but also health and productive capacity. The mantra "गोमद् रयीम्" (Sāmaveda 865) seeks wealth enriched with cows, while "अग्ने रयीं नः" (Sāmaveda 1257) invokes Agni for wealth and cattle. In "गोभिरश्वैः समनक्त" (Sāmaveda 1093), the aspiration for a life enriched with cows and horses is expressed. Similarly, "गोमन्तं नः कृधि" (Sāmaveda 1379) prays for cattle-filled prosperity, while "गावो भगो गाव इन्द्रः"[36] identifies cows with

[32] Sāmaveda 825
[33] Sāmaveda 829
[34] Sāmaveda 972
[35] Sāmaveda 1246
[36] Sāmaveda 1463

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fortune and abundance. This cattle-centered outlook clearly indicates that cows constituted one of the chief measures of economic strength.

The importance of horses is also particularly significant. In "अश्वावतीः" (Sāmaveda 301), prosperity associated with horses is praised. The mantra "अश्विनं रयीम्" (Sāmaveda 865) prays for wealth accompanied by horses, while "अश्वस्य भूरेः" (Sāmaveda 1432) glorifies the strength and speed of the horse. In "अश्ववत् धनम्" (Sāmaveda 1784), horse-rich wealth is presented as a symbol of prosperity. Likewise, "अश्वान् नो धेहि" (Sāmaveda 1808) contains a prayer for horses. Horses possessed immense importance in warfare, transportation, and commercial communication; consequently, they symbolized both political power and economic prosperity.

A deep aspiration for wealth is reflected throughout numerous mantras. In "वयं स्याम पतयो रयीणाम्" (Sāmaveda 1880), the desire to become masters of wealth is expressed. The mantra "रयीं नः चित्रमश्विनम्"[37] seeks splendid and prosperous riches, while "सहस्रिणं रयीम्" (Sāmaveda 631) reflects the aspiration for thousandfold wealth. "बहु नो रयीम्" (Sāmaveda 987) prays for abundant prosperity. Likewise, "रयीं धेहि" (Sāmaveda 1124), "रयीं सुवीरम्" (Sāmaveda 1560), "चित्रं रयीम्" (Sāmaveda 1748), and "बृहन्तं रयीम्" (Sāmaveda 1358) portray wealth as the principal source of strength, prestige, and prosperity. These hymns reveal the realistic economic aspirations of Vedic society.

References to gold (*hiraṇya*) also indicate economic advancement. In "हिरण्यम्" (Sāmaveda 991), gold is identified as a valuable form of wealth. The mantra "हिरण्यपाणिः" (Sāmaveda 1263) suggests a state of affluence associated with gold, while "हिरण्यदा" (Sāmaveda 1684) praises the giver of gold and wealth. The expression "हिरण्यवर्णाः" (Sāmaveda 1796) symbolically represents the brilliance and splendour of gold. These references indicate that the concept of metal-based wealth accumulation had already developed during the Vedic age.

Great importance was also attached to strength, vigour, and productive capacity. In "बलम् नो देहि" (Sāmaveda 752), prayers are offered for strength, while "सहः कृणुहि" (Sāmaveda 1312) seeks endurance and power. The mantra "शवः पृतनासहम्" (Sāmaveda 1466) invokes victorious strength capable of overcoming enemies. In "वीरवत् पत्यमानम्" (Sāmaveda 1721), the aspiration for heroic offspring and a powerful society is expressed, while "सुवीर्यं दधातु" (Sāmaveda 1598) prays for strength and productive energy. These references demonstrate that labour power and productive efficiency were regarded as essential foundations of economic prosperity.

The idea of collective welfare also occupies an important place in the Samaveda. In "विश्वानि देव सवितः" (Sāmaveda 974), universal well-being is invoked. The mantra "स्वस्ति न इन्द्रः" (Sāmaveda 1873) prays for peace and security within society. Likewise, "शं नः करति" (Sāmaveda 1499) and "भद्रं नो अपि वातय" (Sāmaveda 1505) express aspirations for collective happiness and welfare. These references suggest that economic prosperity was not merely individualistic but was rooted in clan-based and community-oriented consciousness.

[37] Sāmaveda 865

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The close relationship between religion and economic life is also clearly evident. In "सोम रयीं दधातु नः" (Sāmaveda 592), "अस्मभ्यं सहस्रिणं रयीम्"[38], "इन्द्रो नो धनमाभरत्" (Sāmaveda 1088), "मघवद्भ्यो रयीम्" (Sāmaveda 1588), and "राधो दधातु" (Sāmaveda 1642), wealth, food, and prosperity are sought through sacrificial worship and Soma rituals. The belief that the gods would bestow wealth, cattle, and prosperity upon those who pleased them reveals the intimate relationship between religion and economic life.

Concerns regarding security and protection of property were likewise highly significant. In "पाहि नो अग्ने" (Sāmaveda 1045), "त्रायस्व नः" (Sāmaveda 1198), "द्विषो जहि" (Sāmaveda 1482), "अरित्रान् नुद" (Sāmaveda 1574), and "रक्षा नो गृहम्" (Sāmaveda 1668), prayers are offered for protection against enemies, safeguarding of wealth, and security of the household. Economic stability was thus considered inseparable from the protection of property and social order.

Thus, the mantras of the Samaveda present a vivid and multidimensional picture of Vedic economic life through their discussions of food, agriculture, cattle, horses, gold, wealth, strength, security, and social welfare. Beneath the religious framework of these hymns lies a profound reflection of the production system of an agrarian society, its concept of wealth, social stability, and aspiration for prosperity. Consequently, the Samaveda occupies a distinguished position as a valuable and authentic source for the study of the early history of Indian economic thought.

Atharvaveda

The mantras of the Atharvaveda present a clear and multidimensional reflection of the economic thought of Vedic society. Alongside religious worship, the text discusses various aspects of practical life, including wealth, agriculture, cattle-rearing, trade, debt, preservation of property, social prosperity, and economic ethics. Prosperity and material well-being were regarded as essential elements of human life, and therefore repeated prayers were offered to the deities for wealth, food, cattle, and security. These hymns clearly reveal important foundations of ancient Indian economic thought.

Prosperity and wealth are presented as among the foremost aspirations of human life. In the mantras "अथा वयं भगवन्तः स्याम"[39], "जेदेतारि भगवन्तः स्याम"[40] , "तव श्रियमुपनुद्मसि" (Atharvaveda 7.37.10), "वसु स्वर्हि तस्या भर"[41], and "वसुमान् भूयासं वसु मयि धेहि"[42], prayers are offered for prosperity and wealth. Here, the terms *bhaga*, *vasu*, and *śrī* symbolize fortune, riches, and abundance. In "अस्मासु द्रविणानि धत्त" (Atharvaveda 7.82.1), the gods are invoked to bestow auspicious wealth, while "आसाम् सर्ववीरा भवाम सर्ववेदसः" (Atharvaveda 19.41.6) expresses the aspiration to become masters of all forms of wealth. The mantra "उत नः नग्ना वोषती" (Atharvaveda 1.10.4) condemns poverty and miserliness, whereas "गुणा च भगवत्तमः" (Atharvaveda 2.2.2) identifies prosperity and fortune as among the highest qualities of human life. These references demonstrate that wealth was regarded as a principal basis of social prestige and secure living.

[38] Sāmaveda 631
[39] Atharvaveda 7.13.10
[40] Atharvaveda 3.16.4
[41] Atharvaveda 20.43.1
[42] Atharvaveda 16.1.4

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The importance of food and nourishment is likewise strongly emphasized. In "अनूनू दर्श मा कृष्टिः प्रजया च धनेन च"[43] , the aspiration for a life enriched with progeny and wealth is expressed. The mantra "ऊर्जस्वती पयसा पिन्वमाना"[44] invokes nourishing and life-sustaining food. In "धनं धान्यं पशुं बहुपुत्रलाभम्"[45], the desire for wealth, grain, cattle, and numerous offspring is clearly reflected. Similarly, "धाता दधातु नो रयीम्" (Atharvaveda 7.17.1) and "धाता विश्वा वार्या दधातु" (Atharvaveda 7.17.3) contain prayers for food and material prosperity. These references indicate that food production and nourishment were regarded as the principal foundations of economic stability.

The importance of cattle-rearing is reflected in many dimensions. In "प्रजया पशुभिर्धनेन" (Atharvaveda 8.1.4), prayers are offered for progeny, cattle wealth, and prosperity. The mantra "समः समन्तो युवास्य गोप्यग्रेः"[46] describes a prosperous condition enriched with cows and horses. In "रायस्पोषं नः सचताम्" (Atharvaveda 9.4.22), "रायस्पोषेण सं सृज" (Atharvaveda 6.81.2), "रायस्पोषं यजमानाय धेहि" (Atharvaveda 17.52.1), and "रायस्पोषेण सचामहे"[47], prayers are offered for cattle wealth and economic nourishment. The term *rāyispoṣa* symbolizes wealth, livestock, and productive prosperity. In "सा न आयुष्मती प्रजा रायस्पोषेण सं सृज"[48] , long life, progeny, and cattle wealth are invoked together as integrated forms of prosperity. Likewise, "रयीं दधातु चेतनिम्" (Atharvaveda 19.4.1), "रायश्च पोषश्च संचर" (Atharvaveda 1.93.3), "रायश्च पोषश्च नः सचताम्"[49], "रायस्पोषं वः पुष्यामि" (Atharvaveda 8.5.2), and "रायस्पोषं सचामहे" (Atharvaveda 3.15.8) further reveal the close relationship between cattle wealth and economic prosperity.

The significance of gold and precious metals is also noteworthy. In "हिरण्यवर्णा सुभगा हिरण्यकशीपुरी" (Atharvaveda 5.7.10), "हिरण्यवर्णैर्द्रविणैः" (Atharvaveda 6.123.2), "शतं निष्कान्" (Atharvaveda 20.127.2), "शत निष्का हिरण्ययाः" (Atharvaveda 20.137.5), "हिरण्य निष्का एते" (Atharvaveda 7.99.1), and "पञ्च रुक्माः" (Atharvaveda 1.15.25), references are made to gold, ornaments, and metal-based wealth. Gold functioned as a symbol of prosperity, social prestige, and valuable property. The mantra "विशुर्द्रविणः सुभगा" (Atharvaveda 20.45.2) invokes supreme prosperity and abundance. These references indicate that the consciousness of metal-based wealth had already attained a considerable level of development in Vedic society.

Important discussions concerning debt and economic morality are also found in the Atharvaveda. The mantra "अनृणा अस्मिन् अनृणाः परस्मिन्"[50] expresses the desire to remain free from debt both in this world and in the next. In "अपमित्य धान्यं यज्जग्ध्वा" (Atharvaveda 6.117.2), "अपमित्यमप्रतितं यदस्मि"[51], "इदमहम् अनृणो भवामि"[52], and "इहैव सनतः प्रददाम्" (Atharvaveda 6.117.3), the ethics of borrowing and repayment are discussed. Likewise, "यददीव्यन्न् ऋणमहं कृणोमि" (Atharvaveda 6.117.1), "यथा कल्पं यथा शमं ऋणं संनयामसि" (Atharvaveda 19.50.1), and "यथैव देवो देवतेभ्यः" (Atharvaveda 6.117.2) portray repayment of

[43] Atharvaveda 7.81.3
[44] Atharvaveda 20.84.2
[45] Atharvaveda 19.37.10
[46] Atharvaveda 7.81.4
[47] Atharvaveda 3.15.8
[48] Atharvaveda 3.10.3
[49] Atharvaveda 9.4.22
[50] Atharvaveda 6.117.3
[51] Atharvaveda 6.117.1
[52] Atharvaveda 6.117.3

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debt as a moral obligation. These references demonstrate that economic honesty and repayment of loans were elevated to the level of religious duty in Vedic society.

References to trade and commercial activities are equally significant. In "इन्द्रमहं वणिजं चोदयामि"[53], merchants are encouraged in their commercial pursuits. The mantra "इमां श्रियं शतसेयाय देवीम्" (Atharvaveda 3.15.2) expresses the aspiration for hundredfold profit through trade. In "येन धनेन प्रपणं चरामि" (Atharvaveda 3.15.5), the desire for the growth of commercial capital is articulated, while "प्रतिपणः फलिनं मा कृणोतु"[54] prays for successful transactions and profitable sales. "यच्च बर्हेलं विपणते"[55] refers directly to buying and selling of goods. Likewise, "शुनं नो अस्तु चरित्रं च"[56] and "शुनं नो अस्तु प्रपणो विक्रयश्च"[57] invoke prosperous trade and beneficial exchange. In "धनेन देवा धनमिच्छमानः" (Atharvaveda 3.15.5), "येन धनेन प्रपणं चरामि"[58] (Atharvaveda 3.15.5), and "ते मा युव्रन् यथा क्रीत्वा धनमाहराणि" (Atharvaveda 3.15.2), one finds clear ideas relating to capital investment and profit-making. These references indicate that exchange and commercial activities had attained an organized form within society.

There also existed a profound consciousness regarding preservation and ethical use of wealth. In "शतहस्त समाहर सहस्रहस्त सं किर"[59] the ideal of earning with a hundred hands and distributing with a thousand hands is proclaimed. This reflects not merely accumulation of wealth but also a principle of social distribution. The mantra "निधिं श्रेयिष्ठं परि दद्म एकम्" (Atharvaveda 12.3.46) advocates the use of wealth for noble purposes, while "सत्याय च तपसे देवताभ्यः" (Atharvaveda 12.3.48) emphasizes expenditure of wealth in truth, austerity, and righteous action. Thus, the use of wealth was closely associated with morality and social welfare.

Concepts relating to measurement, production, and economic regulation are also reflected in the Atharvaveda. The mantra "इदं मात्रा मीयमाना मिता च" (Atharvaveda 11.1.6) refers to accurate measurement, indicating the importance of commercial justice and economic discipline. In "यद् कुष्टे यद् वधे" (Atharvaveda 12.2.36), wealth acquired through agriculture and crafts is mentioned. Likewise, "कतिविस्तृता ता वि योजन"[60] and "पञ्च रुक्माः" (Atharvaveda 1.15.25) reflect concepts of measurement and valuation.

Thus, the mantras of the Atharvaveda present a broad and realistic picture of food, wealth, cattle, gold, debt, trade, production, social distribution, and economic ethics. Beneath the religious framework of these hymns lies a vivid portrayal of practical economic life, systems of production, concepts of wealth, and ideals of social welfare. Consequently, the Atharvaveda occupies a position of great importance as an authentic and valuable source for the study of the history of ancient Indian economic thought.

Conclusion

A critical examination of the economic ideas reflected in the Four Vedas clearly reveals that Vedic society was not merely dependent upon religious rituals and spiritual practices; rather, beneath its religious

[53] Atharvaveda 3.15.1
[54] Atharvaveda 3.15.4
[55] Atharvaveda 12.2.36
[56] Atharvaveda 3.15.4
[57] Atharvaveda 3.15.4
[58] Atharvaveda 3.15.5
[59] Atharvaveda 3.24.5
[60] Atharvaveda 20.126.20

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framework there existed a well-organized and realistic economic system. The Rigveda presents valuable evidence regarding agriculture, cattle-rearing, trade, navigation, crafts, and administrative organization, thereby reflecting the daily struggles and economic consciousness of Vedic people. The Samaveda particularly emphasizes sacrificial economic activities, social cooperation, and the concept of distribution of wealth. In the Yajurveda, the practical dimensions of economic life are reflected through references to sacrificial materials, land, cattle wealth, duties, and social obligations. The Atharvaveda presents a more realistic and life-oriented picture of medicine, household life, land, agriculture, wealth, trade, and social security.

The overall discussion demonstrates that an agrarian economy formed the principal foundation of Vedic society, while cattle wealth functioned as the chief indicator of prosperity and economic strength. At the same time, the existence of occupational specialization, crafts, commercial exchange, and administrative organization establishes Vedic society as one possessing a developed economic structure. The economic realities reflected beneath the religious hymns of the Four Vedas provide valuable insight into the origin and development of ancient Indian economic thought. Therefore, the Four Vedas are not merely repositories of spiritual wisdom; they also constitute invaluable documents for the study of the economic history and social thought of ancient India.

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NON-DUALITY AS A METHOD OF READING: BEYOND BINARY LOGIC

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Abstract: The article investigates the application of non-duality as a method of reading texts beyond the framework of binary logic. Traditionally, literary criticism has heavily relied upon binary concepts such as subject/object, self/other, male/female in order to structure meaning and examine systems of hierarchical exclusions. Although both structuralist and post-structuralist approaches have made significant contributions to understand the nature of these structures, the critical investigation often remain grounded in the logic of opposition itself. Drawing on a selective reading of Advaita philosophy, this paper introduces non-duality as a method of interpreting texts that neither denies difference nor treats it as absolute separation. It foregrounds interconnectedness, continuity, relationality and coexistence within literary texts. Furthermore, the article distinguishes non-dual reading from deconstruction by arguing that it seeks to rethink separation as temporary rather than essential. Non-duality, thus, may be understood as a complementary analytical lens that can expand the scope of traditional forms of literary criticism beyond rigid oppositional structures.

Binary oppositions are pairs of opposing ideas in which each concept is identified in relation to the other, often with one term privileged over the other. These oppositions organise our understanding of the world around us. They construct our language and thoughts, influence our social structure, behaviour and our identities. For example, traditionally, men have been associated with strength, rationality, and the public sphere, while women have been confined to weakness, emotionality, and the private sphere, even though these roles are far more fluid in reality. Similarly, social hierarchies are formed on the basis of oppositions such as civilised and primitive or rational and irrational, although these dichotomies are neither rigid nor permanent but continually intersecting and overlapping with each other.

Historically, oppositions such as mind/body, subject/object, culture/nature, self/other, and other related oppositions have structured philosophical investigation, social theory and literary interpretation. Meaning is often constructed through contrast and identity is shaped by exclusion or differentiation. Such structures offer conceptual clarity and logical coherence; however, they also naturalise rigid categories, stabilise hierarchies and constrain understanding by treating difference as fixed and self-contained.

Structuralist thought illuminates how systems of meaning depend on differences. Ferdinand de Saussure believes the meaning of a linguistic sign is determined not by its essence but by relations with other signs within a structure of differences (Saussure 120). According to this framework, language functions as a system of relations in which meaning is produced by distinctions rather than inherent reference. This perspective, in literary criticism, enables critics to detect hidden patterns of opposition, symbolic systems and relational structures inscribed in the text.

Nevertheless, the reliance on binary opposition also reveals some limitations. Interpretative frameworks that define meaning and identity in terms of opposition may emphasise separation and hierarchy rather than relationality and interdependence. Jacques Derrida challenges the stability and independence of binary oppositions and demonstrates that each term depends on what it excludes (Derrida, *Of Grammatology*). Thus, signification cannot be definite but is always deferred through difference. Likewise, Michel Foucault analyses how systems of knowledge generate categories and distinctions that govern thought and social reality (Foucault, *The Archaeology of Knowledge*). Judith Butler further complicates the stability of identity categories by suggesting that identities are performed rather than inherent (Butler, *Gender Trouble*).
Although these critiques destabilise binary structures, they still often operate within the conceptual frameworks of opposition. The act of interpretation often begins with recognising the binary itself and then demonstrating its

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instability or internal hierarchy. In doing this, critical enquiry, then, can be caught up in the very oppositional logic it seeks to oppose. Consequently, literary interpretations may become hierarchical and conflict-oriented instead of relational and interconnected.

This limitation implies the necessity of a methodological reorientation of literary reading. Indian non-dual thought, especially Advaita Vedanta, can provide one possible model for the change of direction. Advaita acknowledges difference and multiplicity; however, it declines to treat difference as absolute and independent. Non-dual thought, therefore, does not dismiss the lived experience of plurality. Differences continue to operate within social, linguistic, and psychological spheres, but they are not viewed as entirely independent or self-sufficient. This approach becomes especially relevant to the analysis of literary texts which often represent identities and relationships as fluid, relational, and constantly evolving. Consequently, this analytical approach enables critics to examine continuity within difference instead of reducing complexities of literature to rigid oppositional structures.

The purpose of introducing non-dualism as a reading model is neither to assert metaphysical clarity nor to dismiss the contribution and significance of Western theories, but to encourage focus on relation, evolving identities and continuity over rigid structures. Non-dualism, therefore may function not as a theological doctrine but as a methodological lens of interpretation to redirect critical attention.

Binary Logic and Its Limits in Critical Reading

For a long time, binary logic has been the central organising principle in literary criticism. Many interpretative frameworks analyse texts by distinguishing opposing terms and tracing hierarchies inscribed within them. Such approaches improve analysis through the identification of patterns of dominance, exclusion and marginalisation in literary and cultural representation. For example, within structuralist analysis dualistic reasoning operates as the fundamental element for understanding a text. Culture is seen as a system of differences, where meaning is produced through difference. By examining these distinctions, it uncovers patterns that otherwise might stay hidden.

Post-structuralism, on the other hand, challenges such opposition, but its attention continues to centre on binary opposition. Deconstructive thought also highlights the instability of oppositional frameworks, and yet they start with the same binary structures they aim to destabilise.

Western critical thought has relied on oppositional frameworks. Even theories which aim to dismantle hierarchies often remain caught within the logic of separation and division. As a result, the focus of critical analysis may primarily be structured around conflict and antagonism. For instance, a feminist reading may examine a text through the conflict between male and female, whereas a Marxist reading may emphasise class-based struggle, and a postcolonial reading may organise interpretation around coloniser and colonised. These approaches continue to hold historical and intellectual significance because they uncover underlying systems of inequality, domination and exclusion operating within the texts and social structures.

However, these analytical frameworks risk becoming reductive when they try to oversimplify ambiguity, contradiction and complex identities to fit into fixed oppositional structures. As the binary continues to serve as the primary mode of analysis, interpretation may often remain focused on instability, reversal and subversion rather than interdependence and relationality, and texts that do not fall into clear categories might be reduced to align with established modes of interpretation.

These limitations are especially evident when a literary text emphasises ambiguity, distinctions or ethical intricacy. Often characters who exist in contradictory positions cannot be easily classified according to any particular ideological perspective. On the one hand, the same literary text may demonstrate elements of domination at work, and on the other hand complicate the distinctions upon which such structures rely. Nevertheless, oppositional models of interpretation sometimes prioritise analytical clarity at the expense of interpretative openness, and thus reduce the

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complexities of literary works into identifiable structures of opposition. It does not mean that such critical approaches are invalid, but the strict adherence to binary systems of classification may limit other possibilities of studying coexistence, continuity and relations between the elements of literary texts. Moreover, it is possible that binary systems may encourage a critical stance that interprets literature in terms of contradiction and division. Although, conflict remains an important component in literary theory, not all connections within the text have to be understood only in terms of opposition. Emotional attachment, shared vulnerability, moral responsibilities, memory and dependence often transcend such rigid binaries. Therefore, a methodological approach which takes relationality and other aspects of literary complexity into consideration may identify the multidimensional nature of literary meaning that cannot be fully explained by oppositional approaches.

This implies a need for methodological reorientation that goes beyond oppositional logic without ignoring difference altogether. In this context, non-duality may provide a productive interpretative lens that shifts attention from strict opposition to interconnectedness and relational continuity.

Non-Duality in Indian Philosophy: A Conceptual Clarification

A. Clarifying Non-duality

Taking the earlier discussion into account, it is worthwhile to consider Indian non-dual philosophy as a possible interpretative approach to conceptualise oppositions in more relational terms. However, before discussing non-dualism as such a method it is necessary to understand what non-dualism is from the perspective of Indian philosophy. In Sanskrit, the term '*Advaita*' literally means 'not two', referring to the absence of separation or duality. Yet, neither does it assert that everything is identical nor does it deny the presence of difference. Non-dualism does not negate the diversity of the world. Instead, it questions the idea that difference must exist in the form of absolute separation. Thus, non-dualism should be understood not as the elimination of distinction but as critique of rigid separation.

Although Advaita philosophy is often portrayed as mystical and world-negating in character since the colonial era and early Orientalist studies, this school of thought never claims the non-existence of the world. Rather, it suggests that error lies in the manner of apprehending reality. What seems disconnected and self-contained is, in fact, a misperception of reality. In his commentaries on the *Adhyāsa Bhāṣya*, Śaṅkarācārya describes this condition as *avidyā* (ignorance) due to which reality appears fragmented and autonomous. (Shankaracharya, *Brahma Sutra Bhāṣya* 1-8). He repeatedly emphasises that *Ātman* and *Brahman* are not separate, which suggests that the differences we see are part of a broader relational continuity (Shankaracharya, *Ātma Bodha*).

Non-dualism, at a conceptual level, brings about transformation in our knowledge and reality. The existence of difference itself is not the central issue here, but the misapprehension of its nature. This misapprehension does not lie in perceiving their difference but in the assumption of their independent existence. In other words, appearance and reality are not completely opposed to each other; rather their relation requires careful interpretation (Deutsch, *Advaita Vedānta: A Philosophical Reconstruction*). Therefore, when applied to literary criticism, non-duality invites critics to examine how meanings arise in relation to one another, rather than through isolated conflict.

The application of non-dualism in this article remains significantly selective and methodological without being theological. It does not aim to reconstruct the entire philosophical system but to draw attention toward a conceptual approach that highlights relation, fluidity and co-creation.

B. How Non-Dual Reading Changes Interpretation

A non-dual way of reading does not simply reverse the binaries or to privilege an excluded term over the other. Instead, it asks how seemingly contradictory categories emerge through relational processes that resist complete

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separation. Meaning emerges through relational interactions rather than isolated identities. Such a method thus addresses ambiguity, transition and interdependence in textual representation.

For example, instead of viewing nature and culture as two separate categories, a non-dual reading would explore how each term shapes and transforms the other. Similarly, rather than seeing self and other as completely separate identities, the focus would shift toward continuity, relational formation and interconnectedness. Thus, the analytical approach moves from conflict alone to shared structure and continuity.

Such an approach to texts may also transform our perception of literary tension. In oppositional frameworks contradictions usually tend to manifest themselves primarily in terms of conflict between distinct categories or positions. A non-dual reading, by contrast, may see a state of contradiction as a symptom of overlapping realities, indistinct boundaries or incomplete separation between experience and identities. Therefore, the ambiguity found in literature can continue to be productive without necessarily being understood in terms of fixed interpretative closure or rigid oppositions. A non-dual method of reading may thus encourage critics to adopt a slower and more relational form of criticism. Rather than structuring meaning right away within hierarchical and exclusionary frameworks, the critic explores modes of transition, coexistence and interconnectedness in the text. Meaning in literature emerges not only through antagonism but also by relations that unsettle strict conceptual boundaries.

Non-dual reading opens up space for liminality and fluidity within the text. Social structures, characters and identities often exist in states of transformation defying absolute categorisation. Oppositional frameworks may simplify such complexity by confining literary representation into strict divisions. However, a non-dual approach allows contradiction and multiplicity to coexist without collapsing into hierarchy or antagonism immediately.
This framework can be helpful especially for understanding contemporary literature, where identities and social realities often seem fragmented, unstable or relationally formed. Instead of structuring interpretation around domination and exclusion non-dual reading examines the dynamic connection through which meaning is produced.

Such an approach also calls for epistemic humility. Interpretation often depends on categorisation to achieve clarity. But this clarity may obscure more nuanced relations in the text. A non-dual reading suspends such urgency to categorise. It makes room for ambiguity, not because it fails to interpret but because it seeks to engage the multilayered meanings in the text.

This type of method also allows the critic to maintain unity and difference together without collapsing them into one another. Unity is not understood as homogeneity, and difference is not understood as absolute separation. Instead, they are seen as existing side by side in a non-hierarchical manner. The textual element may cohere and simultaneously retain internal differences and tension.

C. Non-Duality and Deconstruction

Non-dual reading shares some of the concerns of post-structuralist criticism in its rejection of stable and self-sufficient concepts. Derrida's deconstruction makes evident that binary oppositions are unstable because each term derives meaning through its relation to the other (Derrida, *Of Grammatology*). Thus, deconstructive reading destabilises hierarchies of meaning and reveals the tension behind conceptual opposition.

However, non-dual reading is not identical to deconstruction in its interpretative approach. Whereas deconstruction exposes the instability in oppositional terms, non-dual analysis shifts the focus from instability to relational continuity. The primary concern here is not merely the collapse of binaries, but rather the possibility that separation itself is provisional rather than fundamental.

In this respect, non-duality does not simply aim to expose contradictions or endlessly defer meaning. On the contrary, it explores the formation of such categories through interconnectedness and non-absolute relational structures. The

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interpretative focus, therefore, becomes less about dismantling oppositions and more about understanding interconnectedness. This perspective broadens the potential of literary criticism by allowing critics to explore relations without reducing complexity to hierarchical rigidity or perpetual instability.

Illustrative Textual Example

A brief example may help to clarify what non-dual reading entails in contrast to conventional oppositional reading of literature. Traditionally, oppositional readings interpret literary relationships in terms of polarities such as self/other, male/female or civilisation/wilderness. A non-dual approach, on the other hand, would be less concerned with demonstrating the instability of the opposition than with understanding the interconnectivity of apparently separate identities. Most characters in literature learn about themselves through social interaction, memory, relationships or emotional attachment. Instead of viewing self and other as entirely distinct identities such reading would consider continuity and relationality through which identity emerges within the text. This kind of reading does not dissolve tension or difference; instead, it redirects focus toward relationality and coexistence beyond rigid separation. Such a reading, therefore, leaves the complexity of literature open rather than reducing them to an either/or conceptual divide.

This may prove significant in narratives involving trauma, intimacy, memory or displacement where identities are often constituted in relation to others rather than as isolated individuals. Characters may form their identities through relations of social dependence, shared history and emotional attachment with others. In such cases, it is difficult to perceive identity as completely autonomous since selfhood itself is constituted through interaction and relational continuity. For instance, the portrayal of family relationships in literature often complicates the distinctions between individuality and collective identity. Personal desires, obligations, memories, emotional legacies become closely intertwined. Likewise, stories which deal with marginalisation, colonialism or migration often expose identities shaped by cultural overlap and shared historical experiences rather than by fixed conceptual categories. Thus, a non-dual analysis enables critics to explore how literary texts engage with fluidity of identity, relations and coexistence.

Conclusion

The persistent presence of binary logic in literary criticism articulates both its analytical strength and limitations. Although this framework has played a significant role in literary criticism, philosophy and cultural systems, it has also reinforced conceptual divisions that restrict interpretative possibilities. Therefore, it is necessary to explore alternative modes of interpretation which may address the complexities without being dependent on fixed divisions.

The article argues that non-duality, when engaged selectively and methodologically, can offer an effective alternative in the field of literary criticism. With reference to certain aspects of Indian Advaita philosophy, it can be said that non-duality as a methodological approach acknowledges the presence of difference while at the same time encourages relational and non-hierarchical thinking. Without denying plurality or contradiction, it reorients the analytical approach from rigid opposition toward coherence, relationality and interconnectedness.

A non-dual approach to textual reading invites scholars to explore how meanings, categories and identities are produced relationally. Rather than framing interpretation solely around ideas of domination and conflict such an approach draws attention to relationality, continuity and coexistence. This way of approaching texts may be particularly valuable in the context of contemporary literary works in which identities and social realities often resist rigid categorisation.

It is important to note that in this article non-dual approach has not been suggested to replace the existing theoretical frameworks. The importance of binary logic in comprehending hierarchy, power and discourse is undeniable. Non-duality, in this context, acts as a complementary lens of interpretation that expands the scope of critical analysis beyond rigid binaries. Therefore, the significance of non-duality does not lie in affirming metaphysical certainty, but

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in opening possibilities for rethinking interpretation itself. With this shift from separation to relation literary criticism can perhaps be more responsive toward complexity, fluidity and interconnection through which meaning emerges.

Non-dual reading's methodological significance rests upon the ability to generate interpretative space beyond strict binary conceptions. In other words, it recognises that literary meaning is not exclusively constructed around dualistic structures. Instead, it emphasises relational modes of identification, categorisation and experience. This does not mark the limit of critical enquiry, nor does it reject the necessity of examining issues of power, hierarchy and dominance. Rather, it expands the scope of critical reading by acknowledging that literary texts often extend beyond the limitations of conceptual binaries. In contemporary literary scholarship where issues of fragmented identity, cultural hybridity, ecology and ethics of coexistence have become central to interpretative practice, non-dual reading may provide a valuable critical intervention. Its value does not lie in its ability to provide an alternative approach to existing critical theories but in prompting criticism to reconsider the nature of relation, interconnectedness and continuity in literature.

Ultimately, the concept of non-duality is not introduced as an ideological imposition but as an interpretative tool that will allow literary interpretation to transcend the confines of binary thinking. This shift, therefore, facilitates a more flexible and nuanced approach of textual analysis.

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PERFORMING ARTS AS PEDAGOGY: PERSPECTIVES FROM 'NĀṬYA ŚĀSTRA' IN THE CONTEXT OF INDIAN KNOWLEDGE SYSTEMS

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Abstract: In the 21st century education is being dramatically changed from rote orientated teaching towards holistic, immersive and learner-centered approaches. Indian Knowledge Systems (IKS) in such transition provide rich philosophical and pedagogical insights that integrates cognition, emotion, embodiment and culture. This paper explores the instructional implications of performing arts as prescribed in Nāṭya Śāstra in the larger context of Indian Knowledge Systems. This is a conceptual and analytical investigation based on textual interpretation and secondary literature which investigates the manner in which the Nāṭya Śāstra constructs learning as an experiential and emotionally absorbing activity . Key words such as rasa (aesthetic emotional experience), bhava (emotional states) and abhinaya (expressiveness via body, speech and gesture) are treated as teaching tools and not only as artistic principles. Moreover, the research links these indigenous beliefs with the contemporary educational theories like experiential learning, constructivism and National Education Policy (NEP) 2020 that encourages integration of arts and holistic development. The study concludes that the performing arts are able to offer positive benefits to emotional intelligence, creativity, communication skills and student engagement in classroom settings.

Introduction

Education has traditionally been understood as a methodical transfer of knowledge from teacher to student. But new educational theories stressing active learning, emotional engagement and learner agency have increasingly challenged this linear model. In this perspective education is not a simple collection of data but a process of change that includes cognitive, emotional and social growth. In this paradigm of change Indian Knowledge Systems (IKS) provides a philosophical framework centered in knowledge, life, ethics, aesthetics and experience. IKS emphasizes holistic understanding in contrast to piecemeal discipline systems where learning is interwoven in cultural and spiritual factors.

There is no parallel to the unique position occupied by the Nāṭya Śāstra in the classical Indian literature. It is usually attributed to Bharata Muni, and is generally considered the earliest Indian literature on the fundamentals of drama, dancing and the stage. But it is so much more than the performing arts. It provides an intricate understanding of human emotion, communication, aesthetics and experiential learning. Nāṭya Śāstra performance is not just entertainment, it is a way of transmitting knowledge and teaching emotions. The audience is not passive but actively experiences rasa, the artistic core of emotions. This regards learning as an intensely immersive, participatory and emotive activity.

The purpose of this study is to argue that the Nāṭya Śāstra might be considered an early model of pedagogy that is analogous to the ideas that are currently being used in the field of education. This study aims to demonstrate the essential principles of performing arts and their integration into current education to realize holistic learning outcomes.

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Review of Related Literature

The present study draws upon multidisciplinary literature from Indian Knowledge Systems, education theory, performance studies and psychology of learning. This review reveals the ways in which indigenous instructional traditions, especially those in the performing arts, shape current educational discourse.

2.1. Philosophy of Education and Indian Knowledge Systems (IKS)- Indian Knowledge Systems (IKS) are getting fresh attention in modern educational policy and research in the context of the implementation of the National Education Policy (NEP 2020). The policy specifically refers to indigenous knowledge systems as the basis for holistic education and national curriculum reform.

According to Government of India, (2020): "India has a rich tradition of knowledge systems that include not only scientific and mathematical thinking but also arts, philosophy, and cultural practices that promote holistic development." This remark places IKS as a full epistemological framework rather than a cultural supplement. In this context, knowledge was not divided into distinct disciplines but was viewed as interrelated and experiential. Sharma (2020) further conceptualises IKS as;"A cumulative and dynamic system of knowledge rooted in lived experience, ethical values, and cultural continuity." This perspective has three crucial dimensions: continuity of tradition, experiential learning and value-based education. Similarly, Kumar (2019) mentions that Indian educational theory has traditionally emphasized observation, imitation, reflection and conversation between teacher and learner. The fact that these concepts are so closely aligned with constructivist techniques in contemporary pedagogy supports the notion that indigenous knowledge systems (IKS) are not in opposition to contemporary education but rather complement it by utilizing an indigenous perspective.

Performing Arts in Education: Indian and Global Perspectives- It is generally accepted in both Western and Indian academic systems that the performing arts play an important part in the educational process. In the field of Western educational philosophy, John Dewey (1934) makes the argument that art is a sort of experience that combines cognitive and emotional components. He writes:"Art is the most effective mode of communication of experience." This view establishes the idea that learning through art is not peripheral but vital to meaningful education.

In the Indian setting, the performing arts have their roots in cultural and pedagogical traditions. As Ranganathan (2018) notes:"In Indian tradition, performing arts are not isolated aesthetic practices but are deeply connected with moral, emotional, and intellectual development." According to this, the performing arts serve not only as a form of entertainment but also as a channel for the holistic development of the human being. Schechner (2002) further enhances this notion in performance studies with his definition of performance as "restored behavior", meaning that it is learned, rehearsed and turned into meaningful social action. This idea is very much in line with the systematic training systems seen in ancient Indian performing traditions. Together, these ideas frame performing arts as a legitimate teaching instrument connecting emotion, cognition, and social learning.

Nāṭya Śāstra as a Foundational Aesthetic and Pedagogical Text- Nāṭya Śāstra is one of the earliest systematic treatises on dramaturgy, aesthetics and performance theory. It is traditionally assigned to Bharata Muni, and has been regarded over the years as both an artistic handbook and a philosophical treatise. Vatsyayan (1996), a leading scholar of Indian aesthetics, writes of the Nāṭya Śāstra as: "A comprehensive theory of aesthetic experience that integrates perception, emotion, and expression into a unified cognitive framework." This perspective is important since it reframes the idea of Nāṭya Śāstra as not only an artistic text, but also a cognitive-emotional system. Performance is not only representation but also a systematic way of experiencing and conveying knowledge. Furthermore, Dutta (2017) notes that the Nāṭya Śāstra offers an early semiotic system of communication, where meaning is produced through gesture, movement, and expression, rather than through language symbols alone. This makes it very relevant to contemporary multimodal learning theories. Therefore, Nāṭya Śāstra might be considered as a crucial text of combining aesthetics with pedagogy, and it is very important for the present educational reconstruction in IKS.

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Rasa Theory and Emotional Aspects of Learning- One of the most prominent notions in Nāṭya Śāstra is the philosophy of rasa, or the aesthetic emotional experience that is evoked in the audience. Traditionally, rasa is considered to be the 'essence of emotion' experienced in creative performance. Bharata Muni defines rasa as an aesthetic experience resulting from the transformation of emotional states into universalized sensation. This change allows the audience to feel emotions in an exalted and removed but emotionally engaging manner. Modern scholars have related rasa theory to emotional cognition. Ranganathan (2018) states that: "Rasa can be understood as a process of cognition and emotion in which learning is mediated by aesthetic engagement and emotional resonance." Similarly, in the neuroscience of education, Immordino-Yang (2016) writes: "We only learn deeply when it is emotionally meaningful." This gives significant scientific confirmation for the pedagogical significance of the rasa theory. It suggests that emotional engagement is not an add-on but intrinsic to good learning.

Bhava and Abhinaya: Embodiment and Expression in Education- In Nāṭya Śāstra, bhava is the internal emotion and abhinaya is the expression of that emotion through body, speech and gesture. Schechner (2002) defines performance as the externalization of internal states into communicative action. This is very much in line with abhinaya which is sort of a codified system of embodied communication. From an educational standpoint, bhava is internalization and contemplation; abhinaya is expression and communication. They are a cycle of experiential learning, together. This process is further supported by Gardner's (1983) idea of multiple intelligences, particularly bodily-kinesthetic and interpersonal intelligence, which emphasize learning through movement and social contact. When taken together, these ideas demonstrate that learning is not simply a cerebral act, but very much embodied and expressive.

Rationale of the Study

There is a growing interest in Indian Knowledge Systems (IKS) and arts-based education, however the research available is predominantly about policy-level integration of IKS in curriculum frameworks or about the general benefits of performing arts in education. While most studies argue about the significance of indigenous cultures and holistic learning, very little is spoken about their practical pedagogical use in classrooms.

Furthermore, the arts-based education literature highlights the crucial role of drama, music and performance in the development of creativity, communication and emotional maturity. However, only a limited number of studies have examined the Nāṭya Śāstra in a systematic pedagogical context. Concepts like rasa, bhava, abhinaya are evaluated from the aesthetic or

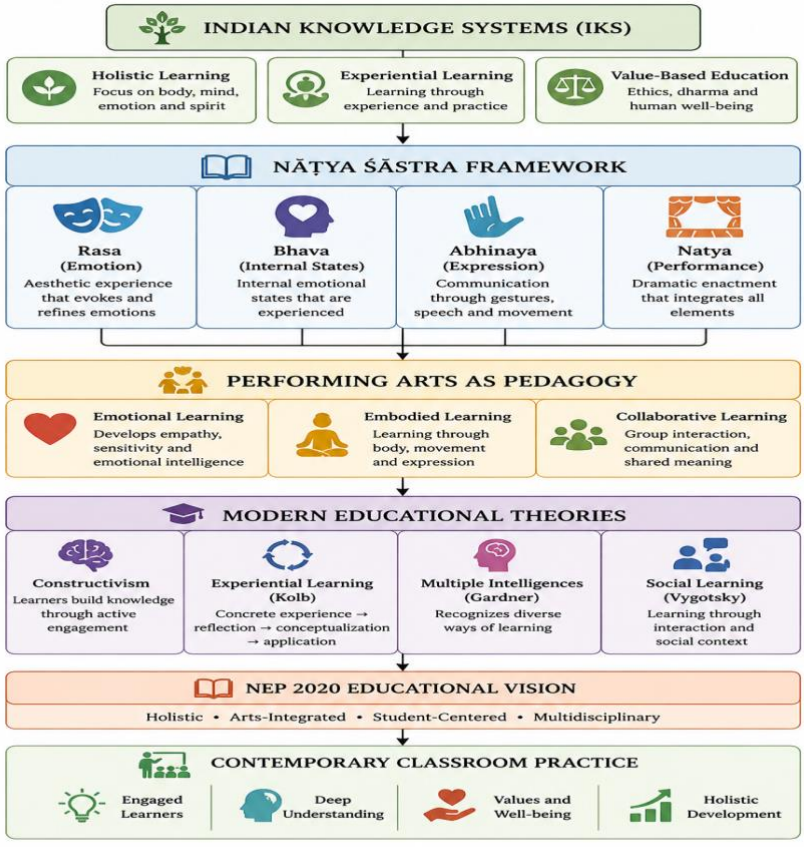

Figure 1. Conceptual synthesis of literature linking Indian Knowledge Systems, Nāṭya Śāstra, performing arts, and contemporary educational pedagogy.

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cultural points of view and not from the educational standpoints.

Moreover, there is a paucity of studies that explicitly connect these classical notions with modern educational methods and the implementation of NEP 2020. This creates a disjunction between indigenous theoretical knowledge and its execution in the classroom. In this way the present study attempts to fill this vacuum by identifying Nāṭya Śāstra not only as a cultural book but also as an operational educational model in the Indian Knowledge Systems which can contribute to holistic and experiential learning.

Objectives of the Study

The objectives of the present inquiry are as follows:
i. To understand the concept of Indian Knowledge Systems in education.
ii. To present a critical look at the teaching features of the Nāṭya Śāstra.
iii. To study the role of Rasa, Bhava and Abhinaya in teaching learning process.
iv. To understand the role of performing arts in holistic and experiential learning.
v. To examine the relationship between the Nāṭya Śāstra and the current educational practices in NEP 2020.

Conceptual Framework

The conceptual framework of the present study is based on the premise that education is not only a method of transmission of information, but an integral process involving cognition, emotion, expression and social interaction. From this perspective, Indian Knowledge Systems (IKS) provide an indigenous epistemological background, with a focus on experiential, value-based and integrated learning. The framework aims to establish a conceptual relationship between IKS, Nāṭya Śāstra, performing arts pedagogy, and contemporary educational practices. Indian Knowledge Systems provide the broadest level of philosophical basis to the study. IKS understands learning as a multi-dimensional process where knowledge relates to lived experience, ethical principles, culture and self-development. While fragmented disciplinary approaches tend to focus just on intellectual development, IKS provides comprehensive knowledge by combining intellectual, emotional, physical and aesthetic dimensions of learning. This comprehensive attitude is the foundation of perceiving the performing arts not just as entertainment, but as a valuable teaching activity.

Within this larger framework, Nāṭya Śāstra emerges as an important educational and artistic text. The text is classically connected with drama and performance but it offers profound understanding of human psychology, emotional engagement, communication and learning from experience. The research concentrates on four important principles from Nāṭya Śāstra, namely rasa, bhava, abhinaya and natya and explains them pedagogically. Rasa is the emotional involvement of learning. It implies that learning is meaningful when learners are emotionally involved in the content. Rasa can also contribute to the generation of interest, development of empathy, emotional intelligence and the long term retention of knowledge in the classroom pedagogy. In the same way, bhava points to inner emotional states and reflecting experiences. It allows for self-awareness, reflection and affective learning in an educational context.

The framework also contains abhinaya, meaning communication through gesture, speech, body movement and facial expression. In education this idea is connected to activity-based learning, role-play, dramatization and embodied pedagogy. It emphasizes that learning is not necessarily verbal, but may also be through expression and performance. All these characteristics converge in the idea of natya or performance, a participatory and experiential method of learning, in which information is actively constructed by the learners.

It further connects these classical notions to modern views of education. The experience aspect of Natya coincides with Kolb's experiential learning theory and its focus on expression and active engagement is in line with constructivist approaches provided by Piaget and Vygotsky. The embodied and expressive aspects of abhinaya also

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fit well with Gardner's idea of multiple intelligences, notably bodily-kinesthetic and interpersonal intelligences. At the practical level, the framework links these ideas to the vision of National Education Policy (NEP) 2020, advocating for comprehensive, multidisciplinary and arts-integrated education. NEP 2020 stresses learner-centered pedagogy, innovation, critical thinking and experiential learning. Thus, the framework proposes that Nāṭya Śāstra can provide an indigenous pedagogical model that can contribute to the modern educational revolution. Therefore, the conceptual framework indicates that the incorporation of Indian Knowledge Systems and Nāṭya Śāstra might contribute to making the educational process more emotionally appealing, culturally grounded and inclusive. It presents performing arts as relevant instructional instruments that can serve to improve modern classroom practices and not as simply co-curricular activities.

Methodology

The present study is qualitative and conceptual in nature and tries to analyze the pedagogic significance of Nāṭya Śāstra in the Indian Knowledge Systems (IKS). As the study is mostly focused on interpretation and theoretical understanding rather than number analysis, a qualitative method was deemed suitable. The research is mostly based on secondary data sources including books, research articles, journals and policy documents relating to Indian Knowledge Systems, Natya Shastra, performing arts and education. The National Education Policy (NEP) 2020 has also been cited to explain the current relevance of arts-integrated and holistic learning.

The major approaches of analysis are document analysis and thematic interpretation. The key principles, namely, rasa, bhava, abhinaya and natya were analyzed and interpreted in the light of modern educational theories and classroom methods. The analysis also tries to connect these notions to experiential learning, constructivism and learner-centered pedagogy.

The study is conceptual and so no primary data collecting, survey or statistical analysis is included. The methodology is intended to offer a theoretical insight into how Nāṭya Śāstra might be used as a teaching tool in modern education.

Analysis and Discussion

The present section thematically analyses the instructional elements of Nāṭya Śāstra in the framework of Indian Knowledge Systems (IKS). The research discusses classical aesthetic concepts as pedagogical tools and ties them to modern theories of learning and classroom practice.

Rasa as an Emotional Pedagogy- Rasa is the term in Nāṭya Śāstra for the aesthetic emotional experience that is evoked in the audience by performance. In theory, rasa is the emotional investment in learning that is essential for long term attention, motivation, and meaningful information.

Learners learn better when they are emotionally involved with the material. This is also backed by cognitive psychology that suggest that emotionally charged experiences are more likely to be retained in memory. Rasa, thus, makes learning an active experience and not a passive one. For example, if during teaching historical events like independence movement the students are emotionally engaged to the suffering, courage and sacrifices of the freedom fighters through storytelling or dramatization, the learning becomes deeper and meaningful. Instead of memorizing dates and facts, students get to feel the emotional center of the event, which improves understanding and retention. Thus, Rasa as a pedagogical tool connects intellect and emotion, thereby resulting in a more effective and student-centered learning.

Bhava and Reflective Learning- Bhava is the emotional feelings or mental states portrayed in performance. Bhava is an inwardness, reflection, awareness of emotions in an educational context. Learning is external expression, but also beneath process. Bhava asks students to reflect about their experience, thoughts and feelings on a concept. This

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reflecting dimension allows emotional learning and the development of values. For example, in the study of environmental pollution pupils might be shown how pollution affects their life, sentiments and future. This contemplation contributes to building awareness and sensitiveness towards environmental challenges. In pedagogical terms, bhava is about the development of emotional intelligence. In holistic education, students are involved in monitoring, analyzing and managing their emotions. So bhava is the connection between knowing and feeling emotions.

Teaching Abhinaya and Expression- Abhinaya is expressiveness through facial expressions, gestures, bodily movements and voice. In education this is learning via expression, learning through doing. The concept of abhinaya is similar to modern teaching approaches like role-play, dramatization and simulation exercises. These strategies enable students to become active participants in the learning process, rather than passive recipients of knowledge. For example, students may engage in role-plays, or short plays based on the course subject in an English language class. The result is improved communication skills, confidence and intellectual clarity. In science disciplines students can also physically move and illustrate processes like photosynthesis or water cycle. Thus, Abhinaya allows for embodied learning, where the body is an active language of knowledge. Cognitive development: Promoting physical expression and social contact.

Natya as Experiential and Collaborative Pedagogy- Natya is the whole expression of rasa, bhava and abhinaya. In educational words, Natya is an interactive, collaborative and experiential learning approach. Natya based learning does not make the children passive learners but active participants creating knowledge via experience. This is in line with constructivist learning theory centered on learning by doing and social interaction. For example, a group of learners doing a theme of "clean and green environment" has to work together, assign roles, understand concepts and express them creatively. This strategy promotes teamwork, creativity, communication and critical thinking skills. The Natya-based approach also creates variation in the classroom because different learners take part in different ways according to their capacities, some through acting, some through narration and others through coordination or expressiveness. Thus, natya becomes a potent paradigm of holistic learning with cognitive, emotional and social dimensions.

Modern Educational Theories and NEP 2020- The pedagogical ideas evolved from the Nāṭya Śāstra are well aligned with the contemporary educational theories and policy frameworks. Constructivist theorists such as Piaget and Vygotsky argue that learners actively generate knowledge via interaction and experience. Similarly, the Nāṭya Śāstra encourages learning via performance, expression and engagement. Gardner's theory of multiple intelligences also supports this integration as he assigns bodily-kinesthetic, interpersonal, and linguistic intelligences which are all actively involved in learning through performing arts. The National Education Policy (NEP) 2020 further promotes arts-integrated and experiential learning. It says education should be a tool for creativity, critical thinking and total growth, not for mindless memorisation. The knowledge base of the Nāṭya Śāstra can, in this way, offer an indigenous instructional framework that is naturally consistent with the aims of NEP. To this end, the introduction of these principles into classroom practice could help to make education a more meaningful, engaging and culturally ingrained process.

Thus, The research reveals that the Nāṭya Śāstra is not only a traditional aesthetic treatise, but a structured teaching system in sum. Its basic ideas – rasa, bhava, abhinaya and natya – together represent emotional, reflective, expressive and experienced aspects of learning. These notions, when seen through the prism of Indian Knowledge Systems and contemporary educational philosophy, provide a strong framework for holistic education.

Educational Implications

The present study has major implications for modern education as the pedagogical notions incorporated in the Nāṭya Śāstra are profoundly relevant and are aligned with the framework of Indian Knowledge Systems (IKS). The results

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hold relevance for classroom pedagogy, curriculum planning, teacher education and policy implementation, especially in the context of NEP 2020.

Implications in Classroom Teaching- This study suggests that the use of performing arts-based practices in conventional classroom education can help the success of the teaching-learning processes. Concepts such as rasa, bhava and abhinaya can be employed to make learning more engaging, emotive and participative. Teachers can promote conceptual knowledge through narrations, role play, dramatisation and expression based activities. For example, abstract concepts in science or social science can be taught through short performances where students feel knowledge instead of memorizing. This strategy promotes active learning and boosts retention.

Implications for Student Learning- The education based on Nātya Śāstra is integrated for entire development of students through cognitive, emotional and social learning. Rasa adds to emotional engagement, and helps youngsters cultivate curiosity and motivation. Bhava promotes contemplation and self-awareness. Abhinaya also helps in increasing communication skills, confidence and creativity. This means that students are active participants in the learning process, not passive consumers of knowledge. It is beneficial for great academic accomplishment and general personality development.

Implications for Teacher Education- Findings suggest that training in ARTS-integrated pedagogy may be a desirable addition to teacher education programs. Future instructors need to be taught how to implement performance-based tactics when teaching in the classroom. Teacher educators can build modules employing dramatization techniques, storytelling approaches and experiential learning activities based on indigenous knowledge systems . This will assist teachers to shift away from traditional lecture tactics and take on more student centric approaches.

Implications for the Curriculum Design- The analysis recommends that performing arts should be included in curriculum frameworks as proposed by NEP 2020. Curriculum developers can design activity based learning modules on the concepts of Nātya Śāstra. Subjects can be arranged to allow for performance, expression and creativity as a means of interdisciplinary learning. This might work to cut down on rote remembering and to promote a more profound mental understanding.

Implications for the Implementation of NEP 2020- The National Education Policy, 2020 lays emphasis on holistic, transdisciplinary and experiential learning. Recent scholarship suggests that the Nātya Śāstra provides a culturally informed framework consistent with such aspirations. Inclusion of arts in education will allow schools to successfully execute NEP's goal of arts integrated and learner centered teaching. It also assists in re-linking schooling to Indian cultural and intellectual traditions. In conclusion, the study demonstrates that the introduction of Nātya Śāstra in education can make the learning experience more meaningful, engaging and holistic. It shifts the focus of education from knowledge to experience, therefore promoting emotional intelligence, creativity, team-work and cultural awareness among the learners.

Significance of the Study

The present study is significant in the context of Indian Knowledge Systems (IKS) and modern educational reform as it reinterprets Nātya Śāstra as a pedagogical framework rather than a mere book on performing arts. Therefore, the work adds to the development of indigenous knowledge in current debates on education.

The significance of the work lies, firstly, in the field of educational theory, as it establishes a conceptual relationship between the aesthetics of ancient India and the pedagogies of the modern world. It is revealed that the classical Indian scriptures provide a systematic philosophy of education which is in conformity with the present day notions of experiential learning, constructivism and emotional intelligence. This assists in the identification of indigenous knowledge systems as academically rigorous and pedagogically helpful.

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Secondly, the study contributes to curriculum creation and educational practice by emphasizing the importance of performing arts in facilitating holistic learning. It indicates that concepts like rasa, bhava and abhinaya can be imaginatively used in classroom teaching to enhance the student's participation, imagination and emotional growth. This is relevant in the perspective of NEP 2020 that advocates arts integrated and learner centric education.

Thirdly, the study has implications for teacher education programs in that it motivates prospective teachers to employ innovative and culturally-based instructional strategies. It stresses that dramatisation, narrative telling and expression based learning are beneficial techniques of teaching, not the usual rote learning approaches.

Finally, the study has larger cultural and academic consequences as it contributes to the decolonization of education by reasserting the relevance of Indian intellectual traditions in contemporary teaching. This means moving from a view of indigenous knowledge as historical or symbolic to a view of it as a present and practical educational resource. Thus, the research has allowed us to understand the theoretical and practical application of education by accepting Nāṭya Śāstra as a rich source of pedagogical knowledge in Indian Knowledge Systems.

Conclusion

The present effort has highlighted the academic importance of Nāṭya Śāstra in the larger framework of Indian Knowledge Systems (IKS). It has been regarded primarily because to its function in the new schooling. A conceptual and analytical study was carried out to assess the perception of the classical aesthetic ideas like rasa, bhava, abhinaya and natya as essential pedagogic aids for enhancing the teaching learning processes.The study shows that the Nāṭya Śāstra is not limited to its conventional purview of performing arts but provides a whole framework for experiential, emotional and embodied learning. Rasa is the key to successful learning. It's emotional resonance. Bhava offers a call to introspection and consciousness. Abhinaya – Movement, gesture & communication based expression focused learning. natya weaves all of them into a single paradigm of interactive and collaborative learning. From the point of view of Indian Knowledge Systems, these notions are quite similar to the modern educational theories such as, constructivism, experiential learning, multiple intelligences and emotional intelligence systems. The study also indicates good congruence of pedagogy based on Nāṭya Śāstra and the objective of National Education Policy (NEP) 2020 encouraging arts integrated, learner centric and holistic education. The study closes by claiming that if the ideals of Nāṭya Śāstra are brought into today's classrooms, education can be changed into a more meaningful, engaging, and culturally oriented process. It takes the emphasis of learning away from rote recollection and towards real experience, emotional involvement and active participation. Not just for the increase of cognitive understanding but for the overall development of the learners. This study concludes that the Nāṭya Śāstra is a dynamic pedagogy of the Indian Knowledge Systems and not a definitive work of aesthetics philosophy. Integrating it into modern education could link the historical wisdom with the current needs of pedagogy and create a more inclusive, inventive and holistic future for education.

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INDIAN KNOWLEDGE SYSTEMS AS REFLECTED IN THE VEDAS

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Abstract: Indian Knowledge Systems (IKS) represent a rich and multidimensional tradition of knowledge that evolved in India over thousands of years through the Vedas, Upanishads, epics, and other classical texts. IKS integrates philosophy, science, education, ethics, spirituality, medicine, ecology, and social values into a holistic framework of life and learning. IKS emphasizes the interconnectedness of body, mind, soul, society and nature. Central concepts such as *Dharma*, *Karma*, *Brahman*, *Atman*, *self-realization*, and *harmony with nature* form the philosophical foundation of Indian thought. The study highlights the major characteristics of IKS that includes holistic learning, experiential knowledge, value-oriented education, spiritual consciousness, and lastly the Guru-Shishya tradition. The present study also examines the interdisciplinary nature of Indian knowledge traditions through different disciplines such as Ayurveda, Yoga, Vedic mathematics, astronomy, architecture, and environmental ethics. The Vedas are discussed as the foundational source of Indian civilization that has significant contribution to philosophy, music, medicine, ethics, cosmology, as well as social organization. Various dimensions of IKS are reflected in the Vedas such as philosophical, educational, scientific, ethical, social, and spiritual. It demonstrates its comprehensive approach toward human development. The relevance of Vedic knowledge in contemporary modern society is also discussed specifically in terms of modern education, sustainable development, mental well-being, environmental consciousness, and value education. The National Education Policy (NEP) 2020 has also emphasized to integrate Indian knowledge traditions into educational practices. In spite of several challenges like scientific validation, curriculum integration, and ideological debate, IKS continues to offer valuable insights for building an ethical, balanced, sustainable, and inclusive society in the modern world.

Introduction

Indian Knowledge Systems (IKS) represent one of the world's oldest and richest intellectual traditions that basically focused on philosophy, science, education, spirituality, ethics, medicine, and environmental consciousness. It is based on ancient Indian scriptures such as the Vedas, Upanishads, Puranas, epics, and classical philosophical texts. IKS reflects a holistic worldview that integrates material, moral, intellectual as well as spiritual dimensions of human life (Kapoor & Singh, 2017). IKS emphasizes the interconnectedness of body, mind, soul, society, and nature. It promotes experiential learning, ethical conduct, self-realization, and harmony with the universe through different concepts like *Dharma*, *Karma*, *Brahman*, and *Atman* (Radhakrishnan, 2008). The Vedas preserve profound insights into philosophy, cosmology, education, mathematics, medicine, music, and social organization. Ancient Indian educational traditions like the Guru-Shishya system, focused on holistic development of personality and value-oriented learning (Altekar, 2009). Similarly, disciplines such as Ayurveda, Yoga, Vedic mathematics, and environmental ethics demonstrate the interdisciplinary nature of Indian knowledge traditions. In contemporary era, the relevance of IKS has gained a lot through educational reforms such as the National Education Policy (NEP) 2020. It advocates the integration of indigenous knowledge, ethical values, experiential learning, and cultural awareness into modern education (Government of India, 2020). Therefore, the study of IKS is essential to understand the intellectual heritage of India along with its relevance to promote sustainable development, mental well-being, moral values, and holistic learning in the modern world.

Meaning and Characteristics of Indian Knowledge Systems (IKS)

Indian Knowledge Systems (IKS) refer to the collected intellectual traditions, philosophical insights, scientific ideas, ethical values and spiritual practices that originated as well as evolved in India over thousands of years. These knowledge traditions are deeply rooted in ancient Indian scriptures such as the Vedas, Upanishads, Puranas, epics,

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and classical philosophical texts. IKS includes diverse fields such as philosophy, education, medicine, astronomy, mathematics, ecology, linguistics, governance, architecture, spirituality etc. (Kapoor & Singh, 2017). The major characteristics of IKS are as follows:

1. **Holistic Nature of Knowledge:** IKS views knowledge as an integrated whole rather than fragmented disciplines that connects physical, mental, emotional, ethical, and spiritual aspects of life.
2. **Value-Oriented Approach:** Indian knowledge traditions emphasize on moral and ethical development along with intellectual growth and in that case values such as truth, non-violence, compassion, and discipline are considered essential.
3. **Experiential Learning:** Knowledge in IKS is often based on direct experience, observation, contemplation, and self-realization rather than only theoretical aspects.
4. **Spiritual Foundation:** Spirituality forms the core of Indian knowledge traditions. The purpose of knowledge is not only material success but also self-awareness and liberation (*Moksha*).
5. **Harmony and Balance:** IKS promotes harmony between humans, society, nature, and the cosmos as it focuses on sustainable and balanced living.
6. **Transmission through Guru-Shishya Tradition:** Knowledge was traditionally imparted through close interaction between teacher and student. It basically focuses on discipline, character building, and holistic learning (Radhakrishnan, 2008).

Principles of Holistic Knowledge

The concept of holistic knowledge is the base to Indian Knowledge Systems. According to IKS, human life cannot be understood without understanding nature, society or spirituality. Holistic knowledge aims at the all-round development of the individual. The important principles of holistic knowledge are as follows:

1. **Unity of Body, Mind and Soul:** Indian philosophy considers human being as integrated entity where physical, mental, and spiritual awareness are interconnected.
2. **Integration of Knowledge and Wisdom:** Knowledge is not just the accumulation of information but the development of wisdom and right conduct.
3. **Self-Development and Self-Realization:** Education and knowledge are directed to understand one's true self and also to realize higher consciousness.
4. **Interconnectedness of All Existence:** The Vedic worldview explains that all living and non-living entities are the interconnected parts of the cosmic order.
5. **Balance between Material and Spiritual Life:** IKS does not reject material progress. It emphasizes ethical and spiritual balance in life (Aurobindo, 1990).

Interdisciplinary Nature of Indian Knowledge

Indian Knowledge Systems are inherently interdisciplinary because ancient Indian scholars did not separate knowledge into rigid categories though there are some important categories, such as:

1. **Ayurveda:** Ayurveda combines medicine, psychology, ethics, spirituality, and environmental understanding.
2. **Yoga:** Yoga integrates physical exercise, mental discipline, meditation, and spiritual growth.
3. **Vedic Mathematics and Astronomy:** Mathematical and astronomical knowledge were linked with ritual practices, cosmology, and philosophical thinking.
4. **Architecture and Ecology:** Traditional Indian architecture (such as Vastu Shastra), incorporated environmental balance, aesthetics, mathematics, and spirituality.
5. **Language and Philosophy:** Sanskrit grammar developed not only as linguistics but also as a philosophical and scientific system of communication (Kapoor & Singh, 2017).

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Dimensions of IKS

1. **Spiritual Dimension:** The spiritual dimension of IKS emphasizes on the exploration of consciousness, self-awareness, and the deeper meaning of life. Indian philosophical traditions focus on understanding the relationship between the individual self, known as *Atman*, and the ultimate reality, referred to as *Brahman*.
2. **Ethical Dimension:** The ethical dimension of IKS highlights the importance of moral and ethical living. Indian philosophical traditions emphasize values and principles that shape human behavior and social conduct. Concepts such as *Dharma* (duty and righteousness), *Satya* (truth), *Ahimsa* (non-violence), compassion, and honesty are considered essential for maintaining individual integrity and social harmony.
3. **Practical Dimension:** The practical dimension of IKS reflects its application in various fields of life, such as agriculture, medicine, governance, architecture, education, and environmental management. Ancient Indian knowledge traditions provided practical solutions for improving human life as well as societal development.
4. **Knowledge and Consciousness:** Indian philosophy gives profound importance to consciousness. Knowledge is viewed not just as intellectual information but also as awareness of reality and self. The Upanishadic teachings encourage individuals to understand their inner consciousness through reflection, meditation, and disciplined living (Radhakrishnan, 2008).
5. **Harmony with Nature:** IKS has respect for nature and focuses on maintaining ecological balance. Nature is considered sacred, whereas human beings are viewed as integral parts of the universe. Vedic traditions emphasize sustainable living, conservation of natural resources, and coexistence with all living beings (Sharma, 2019).
6. **Moral and Ethical Living:** IKS promotes moral living through ethical principles and right conduct. Human actions are expected to align with *Dharma* and universal welfare. Social harmony, compassion, honesty, and self-discipline are regarded as essential virtues as per IKS.
7. **Self-Realization:** Self-realization is one of the ultimate goals of Indian knowledge traditions. The purpose of education is to help individuals discover their true nature so that they can attain spiritual liberation through self-discipline, meditation, ethical conduct, and wisdom.

Fundamentals of IKS: Vedas

The Vedas are regarded as the earliest and most authoritative source of the IKS forming the philosophical, spiritual, cultural, and intellectual foundation of ancient Indian civilization. The term "Veda" is derived from the Sanskrit root *vid*, meaning "to know," that signifies sacred knowledge and wisdom and the Vedas are considered *Shruti* literature, meaning "that which is heard," because they were transmitted orally from one generation to another by sages and scholars over centuries (Radhakrishnan & Moore, 1957). These texts not only contain religious hymns and rituals but also provide knowledge related to ethics, philosophy, education, medicine, astronomy, music, governance, and social life, so the Vedas are considered the primary source of intellectual and cultural traditions of India.

1. The **Rigveda** is the first and oldest of the four Vedas. It contains 1,028 hymns arranged into ten *mandalas* (books). These hymns are dedicated to various deities, including Agni, Indra, Varuna, and Soma. The Rigveda reflects the spiritual beliefs and worldview of the early Aryan people (Sharma, 2003). It discusses themes such as nature, cosmic order, morality, and human life. The text also offers important information about the social, political, and economic conditions of Vedic society. A key idea found in many hymns is the harmonious relationship between humans and nature, which continues to be an important aspect of Indian philosophy. The **Samaveda** is mainly associated with music and chanting. It involves largely of verses borrowed from the Rigveda but arranged in a musical format for sacrificial rituals and religious ceremonies, The Samaveda is regarded as the foundation of Indian classical music because it introduced melodic patterns and rhythmic chanting traditions (Embree, 1988) and the text highlights the importance of sound, rhythm, and spiritual expression in worship and education. During its musical tradition, the Samaveda contributed significantly to the development of performing arts and cultural practices in India.

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2. The **Yajurveda** primarily deals with sacrificial rituals, ceremonial practices, and the duties of priests during yajnas or sacred offerings, divided into two major branches: the Shukla Yajurveda and the Krishna Yajurveda. Unlike the poetic style of the Rigveda, the Yajurveda contains both prose and verse forms that provide detailed instructions for conducting rituals (Dasgupta, 1991). The text echoes the organizational and practical dimensions of Vedic society and emphasizes discipline, duty, and social responsibility and also demonstrates the integration of spiritual beliefs with everyday actions and community life.
3. The **Atharvaveda** differs from the other three Vedas because it focuses on everyday human concerns such as health, healing, peace, protection, and social welfare contains hymns, prayers, charms, and incantations related to medicine, disease prevention, family harmony, and agriculture (Chatterjee & Datta, 1984). It is often considered an important source for the development of Ayurveda and traditional Indian healing systems. It reflects practical knowledge and demonstrates that the Vedic tradition addressed both spiritual and worldly aspects of life.

Structurally, the Vedas are divided into four major sections: the *Samhitas*, *Brahmanas*, *Aranyakas*, and *Upanishads*. The Samhitas contain hymns and mantras, while the Brahmanas explain ritual practices and sacrificial ceremonies, the Aranyakas, also known as "forest texts," discuss meditation and symbolic interpretations of rituals. The Upanishads focus on philosophical inquiry, self-realization, and the relationship between the individual soul (*Atman*) and the ultimate reality (*Brahman*) (Radhakrishnan, 1999). This structure illustrates the gradual transition from ritualistic practices to philosophical and spiritual discovery within the Indian Knowledge System.

Dimensions of Indian Knowledge Systems Reflected in the Vedas

The Indian Knowledge System (IKS), as reflected in the Vedas, encompasses philosophical, educational, scientific, ethical, social, and spiritual dimensions that collectively contribute to holistic human development. In the philosophical dimension of IKS focuses on truth, reality, and the purpose of life and the Vedas and Upanishads explain that reality extends beyond the physical world into spiritual and metaphysical realms (Radhakrishnan, 1999). The Central concepts such as Brahman, the ultimate reality, and Atman, the inner self, emphasize the unity between the individual and the universe (Radhakrishnan & Moore, 1957) with the ideas of Dharma and Karma further encourage moral responsibility, ethical living, and self-discipline (Sharma, 2003). Indian philosophy also explores cosmology, causality, and existence through texts like the Upanishads and Bhagavad Gita (Dasgupta, 1991).

The educational dimension of IKS is delved in the Guru-Shishya tradition, where education was conveyed through close interaction between teacher and student in Gurukulas, This emphasized discipline, humility, and moral values along with academic learning (Altekar, 2009). Ancient Indian education promoted holistic development of body, mind, intellect, and spirit through subjects such as philosophy, astronomy, medicine, mathematics, and music (Mukherjee, 2011). Experiential learning through observation, dialogue, meditation, and practical activities was also an important feature of this learner-centered approach (Nanda, 2004).

The scientific dimension of IKS demonstrates India's contributions to mathematics, astronomy, medicine, agriculture, and environmental studies. The Ancient Indian scholars developed concepts such as zero, the decimal system, and trigonometry, which influenced global scientific advancement (Bose, Sen, & Subbarayappa, 2009), the Ayurveda emphasized holistic healing and balance between body and mind, while scholars like Charaka and Sushruta contributed significantly to medicine and surgery (Lad, 2002). Environmental awareness was another key aspect of Vedic thought, advocating harmony with nature and sustainable living (Dwivedi, 1993).

The ethical and social dimension of IKS emphasizes values such as truth, non-violence, compassion, tolerance, and social harmony (Ranganathananda, 2001) with the principle of *Vasudhaiva Kutumbakam*, meaning "the world is one family," reflects the inclusive outlook of Indian culture and promotes peaceful coexistence (Mahadevan, 1998).

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Indian traditions also stressed duties and responsibilities toward society and humanity, while the Bhagavad Gita highlighted selfless action and ethical leadership (Radhakrishnan, 1993).

The spiritual dimension of IKS focuses on self-realization, meditation, yoga, and liberation where meditation and self-discipline were considered essential for attaining inner peace and wisdom (Feuerstein, 2001). Yoga, as explained in the *Yoga Sutras*, promotes harmony of body, mind, and spirit through physical, mental, and ethical practices (Iyengar, 1993). The ultimate spiritual goal is Moksha, or liberation from suffering and the cycle of rebirth, achieved through knowledge, devotion, and righteous action (Radhakrishnan, 1999). Hence, the Vedas present a comprehensive system of knowledge that integrates material, moral, intellectual, and spiritual dimensions of life.

Significance of Vedic Knowledge in Contemporary Times

The Vedic tradition continues to hold significant relevance in contemporary society. In the fields of education, ethics, sustainability, and mental well-being. In modern education, the Indian Knowledge System (IKS) promotes holistic learning that integrates intellectual, moral, spiritual, and practical development. The National Education Policy (NEP) 2020 strongly emphasizes the inclusion of Indian knowledge traditions, multilingual learning, ethical values, and experiential education to create culturally rooted and globally competent learners (Government of India, 2020). The Guru-Shishya tradition, value-based education, and interdisciplinary learning approaches of the Vedic period provide important insights for present educational reforms.

Vedic thought also contributes to sustainable development and environmental ethics by emphasizing harmony between humans and nature. Ancient Vedic literature advocates respect for natural resources, ecological balance, and sustainable living practices (Dwivedi, 1993). These principles align closely with global sustainability goals and contemporary environmental concerns. Similarly, practices such as yoga, meditation, and self-discipline support mental well-being by reducing stress, improving concentration, and promoting emotional balance (Feuerstein, 2001) So, Vedic wisdom remains relevant for addressing modern social, psychological, and ecological challenges. However, the integration of IKS into modern academia requires critical analysis with Vedic thought has contributed immensely to philosophy, mathematics, astronomy, medicine, ethics, and spirituality, forming the intellectual foundation of Indian civilization (Radhakrishnan, 1999). Its depths include holistic knowledge, ethical orientation, and interdisciplinary perspectives. Nevertheless, certain limitations such as rigid social hierarchies, restricted accessibility of education in ancient times, and overdependence on traditional authority have also been criticized (Sharma, 2003). Furthermore, integrating IKS into modern curricula faces challenges including lack of trained faculty, limited research resources, and debates regarding scientific validation and ideological interpretation and the contemporary discussions therefore focus on balancing traditional wisdom with modern scientific inquiry and inclusive educational practices.

Conclusion

Indian Knowledge Systems represent a comprehensive and multidimensional tradition of knowledge that integrates philosophy, education, science, ethics, spirituality, and social responsibility. Rooted in the Vedas and other classical Indian texts, IKS promotes holistic development through experiential learning, moral values, self-realization, and coordination with nature. Its contributions to mathematics, medicine, environmental ethics, and spiritual practices. It continues to influence contemporary thought and global scholarship (Radhakrishnan, 1999). In the modern context, the integration of IKS through initiatives such as NEP 2020 highlights its relevance in fostering value-based education, sustainable living, mental well-being, and interdisciplinary learning, although challenges remain in integrating traditional knowledge with modern academic frameworks, IKS continues to provide meaningful insights for creating a balanced, ethical, and holistic approach to human development and societal growth.

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FOLK TRADITIONS AS PEDAGOGICAL TOOLS FOR SUSTAINABLE EDUCATION

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Abstract: Traditional folkways, as essential elements of indigenous knowledge systems, have a significant impact on transmission of cultural values, ecological knowledge and sustainable behaviors to succeeding generations. This study was conducted to investigate the potential of folk traditions as a teaching tool to foster sustainable education in higher education students. Quantitative research design was used to conduct the study and data were gathered from 200 post graduate students of the University of Burdwan through standardized tools. Descriptive and inferential statistics was applied to examine awareness, utilization, perceived effectiveness and influence of folk traditions on sustainable learning outcomes. The results indicated moderate awareness and use, but high perceived effectiveness and influence, with significant positive correlation ($r = 0.62$, $p < 0.01$) between the use of folk traditions and sustainable outcomes. The discussion emphasizes that while folk traditions are being employed as useful teaching tools, their formal pedagogical adoption is still quite sporadic. The study suggests that the use of folk traditions within formal education may help to foster a greater understanding of sustainability and is consistent with current educational changes in India, thereby having the potential to influence wider education policy and practice.

Introduction

Education is a fundamental instrument for configuring sustainable societies through the development of environmental consciousness, ethical attitudes and culturally situated thinking individuals. In the last decades, there has been an increasing awareness in the importance of bringing indigenous knowledge systems and folk traditions to formal education for sustainability- oriented authors. Folk traditions, storytelling, songs, rituals, proverbs and practices of the community at large serve as living archives of collective wisdom and embody profound ecological and cultural knowledge accumulated over centuries. Such traditions offer place-based knowledge which is increasingly needed to confront today's environmental and social problems. Nevertheless, although they are valuable, they are still scarcely incorporated, especially in the formal institution, green training falls short to meet the sustainable needs.

The methodological basis of this research is based on socio-cultural and experiential learning theories. Lev Vygotsky (1978) stressed that learning is regulated by means of cultural tools and social interaction; therefore, knowledge contained within cultural forms such as folk traditions can play a critical role in cognitive growth. John Dewey (1938) also stressed the value of learning by doing, in which individuals acquire knowledge through active participation in authentic experiences. Moreover, while learning can be conceived of as a process of experiencing, reflecting and applying, which makes folk traditions excellent pedagogical tools because of their experiential and participatory character (David Kolb, 1984). These theoretical standpoints validate the application of folk traditions as a means to advocate sustainable and holistic education. There is increasing literature endorsing the inclusion of folk traditions and indigenous knowledge in education. Gadgil and Ramachandra Guha (1992) have asserted that traditional ecological knowledge that is enmeshed in local practices is central to sustainable resource management and environmental conservation. In the same vein, Anil K. Gupta (2015) stressed the need for greater recognition of grassroots innovations and indigenous knowledge as solutions to sustainable development and as skills for problem solving. Research e.g. Silva et al. 2023 This integration has been proven to foster contextual learning, develops cultural identity and environmental consciousness among the students. In the Indian setting, use of folk traditions in teaching in

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classrooms has been shown to enhance students' engagement, moral development and sustainability awareness (Kumar, 2022; Sharma & Pandey, 2023).

The present study addresses the gap in the literature by analyzing the awareness, adoption, perceived benefits and influence of traditional knowledge on sustainable learning success. While a number of the qualitative and conceptual studies that have been previously conducted, there is a dearth of empirical quantitative proof linking folk traditions to that of sustainability outcome. This research enriches the body of knowledge by statistically substantiating such claim.

The significance of this study is highly relevant to Indian perspective owing to its diverse culture and traditional knowledge systems, which opens up space for innovation in education. The National Education Policy 2020 calls for inclusion of Indian Knowledge Systems, local traditions and indigenous practices within the curriculum to support holistic and sustainable education. Yet, the execution of these guidelines is still nascent. "Hence, this study makes sense of timely insights into how folk traditions can be used as teaching tools to realize goals both of the pedagogy of sustainable development and of culturally responsive education in India."

Statement of the Problem

Although a rich heritage of folk cultural elements exists and could be used to foster sustainable education, application of these elements in formal teaching–learning processes is still limited. Their efficiency and influence on students' learning results have not been supported by any empirical data. Hence, the issue pertaining to this study is to examine the use of folk traditions as pedagogical tools and their effectiveness in raising awareness about sustainable education among students.

Significance of the Study

The importance of the study lies in the fact that it unveils the potential of folk traditions for sustainable education in the context of indigenous knowledge systems. It offers field data to substantiate the inclusion of culturally congruent pedagogic strategies in mainstream education and thus has implications for curriculum, teacher education and policy. The research is also in accordance with national priorities such as NEP 2020 to match with learners' holistic, value-based and sustainability-oriented learning goals. In addition, it reconciles indigenous knowledge with contemporary education, providing a means for sustaining cultural traditions and meeting modern educational requirements.

Operational Definitions of the Terms

Operational definitions describe how the key constructs of the study are defined, measured and the manner in which measurements are interpreted in the context of the study. In this study, the following terms have been operationally defined:

Folk Traditions" In this research, folk traditions are understood as indigenous cultural practices, forms and knowledge communicated in oral mode or by community participation from one generation to the next. These are storytelling, folk songs, proverbs, rituals, festivals, myths and traditional ecological knowledge. Folklore traditions are operationally defined as respondents' recognition and use of the tradition, frequency of use and effectiveness of containing the tradition in educational settings, as measured by standardized questionnaire items using a Likert scale.

Pedagogical Tools: Pedagogical tools are the teaching and learning methods, strategies and materials that teachers apply in their teaching. For the purposes of this research, folk traditions may be regarded as a pedagogical tool when they are purposefully used (within classroom settings) to facilitate understanding, interest and learning informed by values. This construct is operationalized by respondents' indication of how (rarely, sometimes, frequently) such traditions inform their pedagogical practices.

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Sustainable Education: Sustainable education is an educational pedagogy that fosters the development of environmental consciousness, social responsibility, cultural maintenance and ethical behaviour in accordance with the goals of sustainable development. In this paper with the topic 'Education for Sustainable Development', s-E is defined operation- ally as student knowledge, attitudes and values on sustainability and is assessed by applying standardized items pertaining to environmental awareness, cultural sensitivity and responsible conduct.

Awareness of Folk Traditions: Awareness is conceptualized as the level of knowledge and experience of the specific folk traditions in education among the respondents. As an operational definition, a set of questionnaire items rated on a Likert scale is used and low, moderate and high levels are assigned based on the scores received.

The level of utilization of Folk Traditions: This is the rate at which folk traditions in teaching and learning processes are applied. It is self-reported and divided into three categories: the first is infrequently, the second is occasionally and the third is regularly, with associated numerical grades for the quantitative analyses.

Effectiveness of Folk Traditions as Perceived Effectiveness as perceived refers to the degree to which the respondents perceive folk traditions as a tool for improving teaching-learning processes, especially in sustainability teaching and learning. According to the mean scores, the level of effectiveness was divided into three categories: low, moderate and high.

Effect on Sustainable Learning Outcomes: This construct represents the degree to which a folk tradition contributes to students' learning or acquisition of sustainability-related knowledge, values, attitudes and behaviors. It is operationally defined as the respondents' perceptions of the extent to which they have improved in environmental consciousness, ethical standards and cultural awareness.

Sustainable Learning Outcomes: The sustainable learning outcome refers to observable educational outcomes related to sustainability such as increased environmental knowledge, positive environmental attitudes, cultural understanding and sustainable decisions. These results are transformed by calculating composite scores from responses to standardized scales.

Association between Variables: In this study, association is the statistical dependence between two variables; the use of folk traditions, which is an independent variable and sustainable education outcome, which is a dependent variable. It is quantified by calculating the Pearson product-moment correlation coefficient (r) to assess the strength and direction of the association.

Postgraduate (PG) Students: PG students are those who are pursuing post graduate courses in University of Burdwan and they are the sample of the study. They have been deemed eligible to participate as respondents because of their exposure to higher academia and their critical-mindedness towards teaching methodologies.

Objectives of the Study

- To evaluate the awareness of folk traditions in education.
- To determine the prevalence of folk traditions as pedagogical tools.
- To investigate the perceived efficiency of folk traditions in sustainable education.
- To evaluate the influence of folk traditions on students' sustainability learning outcomes.
- To examine the correlation between usage of folk tradition and sustainable education outcomes.

Hypotheses of the Study

In line with the objectives of the study, the following hypotheses were formulated:
H_{01} (Null Hypothesis): The use of folk traditions and the sustainable education result is not significantly associated.

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Ha_1 (Alternate hypothesis): A significant positive correlation exists between the use of folk traditions and informative sustainable education.
H_{02} (Null Hypothesis): Folk traditions do not influence students' knowledge and values related to sustainability.
Ha_2 (Alternative Hypothesis): Folk traditions contribute with a significant positive effect in students' knowledge and values related to sustainability.

Materials and Methods

Research Design: A descriptive quantitative research design was employed for this study, which is useful for investigating associations and trends between variables in relation to folk traditions and education for sustainability.
Population and Sample: The target population was postgraduate students, and a sample of 200 PG students of the University of Burdwan was drawn through random sampling method to ensure representativeness.
Variable of the Study
A. Independent Variable: Use of folk traditions
B. Dependent Variable: Sustainable educational outcomes
Tools for Data Collection: Awareness, effectiveness and impact were assessed using standardised questionnaires. The tools were based on previously validated and reliable tools, which are widely used in similar settings. The use of standardized instruments is recommended because these materials can be objectively compared and analysed statistically.
Data Collection Procedure: The data were obtained by means of the structured questionnaires from the respondents. Clarity was ensured with appropriate instructions.
Use of Statistical Techniques: Data were analysed using descriptive statistics (frequency, percentage, mean and standard deviation) and inferential statistics (correlation analysis).
Ethical Considerations: The study did not deviate at any point from ethical codes. As well, informed consent and confidentiality were assured, and participation was voluntary. There was no harm or bias in the procedure of collecting data.

Results

The research examines folk traditions with a specific focus on the sustainable education aspect by employing quantitative research methodology. A total of 200 participants (N = 200) including students and teachers were involved in the data collecting process. It analyses the consciousness, utilization, efficiency and consequence of folk traditions in sustainable education. Descriptive statistics including frequency, percentage, mean and standard deviation were calculated and inferential statistics were used to interpret the data.

Level of Awareness of Folk Traditions in Education: This sub-section reports follow respondents' level of awareness of the use of folk tradition in education.

Table 1: Level of Awareness of Folk Traditions (N = 200)

Level of Awareness	Frequency (f)	Percentage (%)	Mean	SD(±)
Low	35	17.5%		
Moderate	105	52.5%	3.48	0.76
High	60	30.0%		
Total	**200**	**100%**		

Source: Data compiled from primary survey conducted by the researcher (2026)

Finding: A moderate degree of awareness among folk traditions in education and 30.0% of them have a high awareness. Minorities (<17.5%) were less aware. The 3.48 mean value represents a somewhat high level of awareness overall which means folklore is quite well recognized but only to a limited extent considered as part of the mainstream educational knowledge.

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Analysis: Finding can be substantiated with regard to both global as well as Indian academic responses to the finding of a majority (52.5%) of respondents being moderately aware of folk traditions in education with less in high awareness and a minute in low awareness.

From Indian perspective, various works assert that folk traditions along with Indigenous Knowledge Systems (IKS) are culturally rooted and widely practiced in day-to-day existence but are weakly infused into academic pedagogy. It makes a situation where knowledge is present at a general level but is not profound and grounded in systematic practice, thus explaining the predominance of moderate awareness in the present study. Take Gupta (2015) who stresses India's vast store house of indigenous and folk knowledge safeguarded in community practices, expressed in stories and embedded in native traditions. Yet he contends such knowledge is frequently disregarded in the formal education system and thus producing partial understanding among learners and teaching. This also supports the present result that the awareness exists but is not yet fully inward or academic solidified. In the same vein, Kireet Joshi (2017) observes that while Indian education is beginning to open the door to traditional systems of knowledge, the curriculum continues to be dominated by western ways of knowing which makes the inclusion of folk knowledge systems within formal pedagogy very minimal. As a result of this, teachers and students do not attain full knowledge, but rather superficial knowledge. Consistent with this tradition, the Radhakrishnan Committee (1948/2009 reprint) had earlier advocated for an infusion of Indian culture and traditional knowledge into education, but has not had a consistent application over the years which still has an impact on levels of consciousness.

On a more recent note, the policy-level document, National Education Policy 2020, lays great emphasis on including Indian Knowledge Systems, heterogeneous indigenous traditions and folk practices in the curriculum and pedagogy. Yet nascent research on its enactment (e.g., Kumar, 2022; Sharma, 2023) suggests that this coalescing process is still under way, with many educators only starting to grapple with these ideas. As a result of this transitional period, awareness of the contents among the concerned people is generally moderate which can also be seen in this data set. Empirical researches in the Indian scenario also corroborate this trend. For example, teachers of Kumar (2022) recognized the relevance of folk traditions in values-based and sustainable education, but many felt ill-equipped and unsupported to make use of them. Sharma and Pandey (2023), on the other hand, found that students are acquainted with folk traditions through informal culture but are "incapable of applying their academic knowledge," resulting in what they term moderate awareness scores. In a wider context, Madhav Gadgil and Ramachandra Guha (1992) with respect to indigenous ecological knowledge situate traditional knowledge and behavior as being closely associated with sustainability but argue that such knowledge and behavioral systems are systematically alienated from the mainstream system of education, thus excluding structured awareness albeit accompanied by cultural knowledge.

Hence the moderate awareness level (M=3.48) that was recorded suggests the indication of a state of transition in Indian education in which folk traditions are beginning to be acknowledged while at the same time there remains the uncertainty of incorporating them systematically into pedagogy.

Extent of Use of Folk Traditions as Pedagogical Tools

This is the part where the degree of employment of folk traditions in teaching and learning processes is investigated.

Table 2: Extent of Use of Folk Traditions (N = 200)

Level of Use	Frequency (f)	Percentage (%)	Mean	SD(±)
Rarely Used	50	25.0%		
Sometimes Used	95	47.5%	3.21	0.82
Frequently Used	55	27.5%		
Total	**200**	**100%**		

Source: Data compiled from primary survey conducted by the researcher (2026)

Finding: Folk traditions are applied in the lessons 47.5% of teachers say only in some cases and a further 27.5% say always. But 25.0% said that is rarely the case. The value of 3.21 as the mean indicates an average application which suggests that, while folk traditions are acknowledged, their use in pedagogy is still evolving.

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Analysis: The result showing that 47.5% of respondents considered using the folk traditions sometimes (27.5% of them reported using them frequently and 25.0% of them had stopped using them), suggested the middling level of application (M=3.21) of these practices. This pattern is corroborated both by Indian as well as international studies, which constantly establish that though folk traditions are perceived as precious cultural knowledge, their organised classroom inclusion stand in a nascent stage. From the Indian angle this middling usage was a reflection of certain structural and curricular realities. Indian Knowledge Systems, including folk traditions, should be incorporated in teaching-learning processes (National Education Policy 2020). Yet, early studies of implementation indicate that this transition is more gradual than immediate as a lot of institutions are still coming to terms with the new pedagogic expectations. Consequently, teachers seem to draw on folk traditions on an infrequent basis rather than regularly, which is in line with the sometimes-used category capturing the highest number of respondents in this study. Indian classrooms are testified to be in line with this. Kumar (2022) observed that while teachers are aware of the pedagogical utility of folk tales, songs and local customs, the application of these is contextual rather than cross-curricular, confined to certain topics or modules. In the same vein, Sharma and Pandey (2023) noted that folk traditions are "often" applied in cultural fest and value education classes, but not during regular teaching learning process, thereby attaining moderate usage. Furthermore, Anil K. Gupta (2015) makes a case that much of India's indigenous knowledge is embedded in communities and in informal settings. And the process of translating that knowledge into formal education is, as institutionally required, a matter of curricular redesign and teacher preparedness, both evolving. This gap accounts for the substantial proportion of respondents (25.0%) who indicated infrequent use, citing barriers that include insufficient training, time limitations and lack of instructional materials. In general, "learning itself is socially and culturally mediated" (p. Folk traditions as culturally embedded resources have the potential to be efficiently used in teaching; yet this potential prompted by an intentional planning of learning situations is what determines effective use. So long as the integration is partial, use will of course be moderate rather than great. International research reaffirms this trend. Silva et al. (2023) state that while traditional knowledge is gaining recognition on a global scale, its application within classrooms is still spotty, more guided by teacher initiative than by the belly of the institution. Similarly, Funk and Woodroffe (2024) have observed that teachers are often under-prepared to teach indigenous pedagogies, leading to inconsistent and incomplete application. In general, the mean moderate score (3.21) indicates a transitional phase in education, in which folklore education is at its first stage of being considered applicable as part of pedagogy, but it is not yet fully or widely adopted for use.

Perceived Effectiveness of Folk Traditions for Sustainable Education

This sub-section showcases opinions of respondents concerning the effectiveness of folk tradition to sustain education.

Table 3: Perceived Effectiveness (N = 200)

Level of Effectiveness	Frequency (f)	Percentage (%)	Mean	SD(±)
Low	30	15.0%		
Moderate	90	45.0%	3.67	0.71
High	80	40.0%		
Total	**200**	**100%**		

Source: Data compiled from primary survey conducted by the researcher (2026)
Finding: A large group of people answered folk traditions are very effective (40.0%) and 45.0% viewed them as effective. Low effectiveness was reported by 15.0%. The positive outlook as the mean score is 3.67 indicates that folk traditions are viewed as effective means in sustainability-oriented education.
Analysis: The high (40.0%) and medium (45.0%) levels of perceived effectiveness of folk traditions among respondents, with a low percentage (15.0%) for the category of low effectiveness, indicates a positive perception (Mean = 3.67). This finding is to a great extent corroborated by the existing research especially in case of India as folk traditions are considered as effective means of sustainability-based education.

The efficacy of folk traditions from an Indian perspective is owing to their contextual and experiential characteristics. The National Education Policy 2020 specifically prioritizes integration of Indian Knowledge Systems (IKS) and local

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and indigenous traditions and practices in education for holistic and sustainable learning. The policy emphasizes that age-old knowledge cultivated through folklore, storytelling, songs and community rituals fosters value, environmental consciousness and cultural continuance, which is directly transferrable to the high and medium effectiveness rankings of the current study.

Scholarly contributions further justify this finding. Madhav Gadgil and Ramachandra Guha (1992) maintain that native and folk customs are ecologically sound and sustainable ways of living shaped by many years of practical experience. When knowledge of this kind is brought into the classroom, it is inevitable that students will come away with a stronger understanding of what sustainability means, which accounts for a big chunk of these traditions being perceived as effective by respondents. In the same vein, Anil K. Gupta (2015) asserts that the knowledge systems of grassroot and folk provide creative and context specific solutions to environmental and social issues. He stresses that the incorporation of such knowledge into teaching and learning processes renders teaching and learning more contextually relevant, experiential and sustainability-focused, which is consistent with the positive attitude indicated by the mean score of 3.67. Research on Indian education has also confirmed this finding. In a study, Kumar (2022) revealed that learners who were facilitated with IG and traditional teaching methods showed enhanced environmental awareness and value-based comprehension which are important portions in sustainable learning. In a similar vein, Sharma and Pandey (2023) found that the use of folk tales and cultural stories in the classroom had a positive impact on students' participation and their moral reasoning and these results significantly contributed to the effectiveness perceived by the students. From a theoretical perspective, knowledge Dewey (1938) is experience-based and active learning is constructed through the interaction with the life situations and contexts of real-life. Since the folk tradition is contained within real-life experience and practices as a community it is only natural that folk traditions are more effective due to the wider applicability of this method in the education system. Moreover, Lev Vygotsky (1978) draws attention to the significance of cultural tools in learning and argues that culturally situated tools such as folk traditions play a part in cognitive and social development and therefore their potency as educational tools can be further supported.

These results are confirmed among international studies. Research (e.g., Silva et al., 2023) reveals that indigenous knowledge systems have much to offer to the field of Education for Sustainable Development (ESD) as they facilitate place-based learning, cultural identity and environmental consciousness. This is why so few in this study considered it to be ineffective. Therefore, the positive mean score and the high and medium efficacy response option ratings suggest that folk tradition pedagogy may be considered a very effective means / tool for contributing to sustainable education even if application in full scale or size is still matter of development.

Impact of Folk Traditions on Students' Sustainable Learning Outcomes

This part discusses the influence of folk culture on how students construct and perform sustainability knowledge.

Table 4: Impact on Sustainable Learning Outcomes (N = 200)

Level of Impact	Frequency (f)	Percentage (%)	Mean	SD(±)
Low	28	14.0%		
Moderate	92	46.0%	3.74	0.69
High	80	40.0%		
Total	**200**	**100%**		

Source: Data compiled from primary survey conducted by the researcher (2026)

Finding: The results informed that the moderate impact of folk traditions on sustainable learning was experienced by 46.0% of respondents and 40.0% experienced such a strong influence. Only 14.0% said they were the least affected. The average score of 3.74 representing 'agree' also indicates a strong positive impact of folk tradition towards development of knowledge and values related to sustainability education (SE) by students.

Analysis: The result that 46.0% had a moderate impact, 40.0% was a high impact of folk traditions on sustainable learning (Mean = 3.74) suggested a strong positive impact regarding students' awareness and values for sustainability. This outcome is strongly supported by the earlier studies, especially in the Indian scenario, where folk traditions are associated with ecological wisdom, cultural values and community-based education.

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From the point of view of policy, the National Education Policy 2020 (NEP, 2020) stresses the inclusion of Indian Knowledge Systems (IKS) with folk traditions as a component of education for the realization of holistic, value based and sustainable learning. The policy acknowledges that indigenous ways are, by their very nature, environmentally sustainable, socially responsible and culturally continuous. This study's findings, high and moderate levels of impact, are representative of this synthesis and suggest that when such traditions are used as sources of learning, students' understanding of sustainability is significantly enriched. Scholarly works are also a further warrant for this finding. Madhav Gadgil and Ramachandra Guha, 1992) Maintaining traditional ecological knowledge woven into folk ways ensures sustainable resource use and charismatic environmental ethics. When learners interact with such knowledge, they acquire a more profound and situational understanding of sustainability, which would be an explanation of the strong positive influence seen in the mean score.

Likewise, Anil K. Gupta (2015) advances that indigenous and folk knowledge systems nurture sustainable, nature-based solutions to environmental and social concerns of our times. Bringing these into education supports learners' problem-solving competences and sustainability awareness, which helps in achieving higher levels of influence. The outcome is also supported by empirical studies in the Indian context of education. The study by Kumar (2022) revealed that students participated in pedagogy based on indigenous knowledge showed improvement in their environmental awareness and sustainable actions. Sharma & Pandey (2023) also found that story-telling both by way of native narratives and traditions in the classrooms further enhanced the students' moral values, sense of cultural identity and environmental sensitivity, which are necessary ingredients of sustainable education. From a theoretical view, Kolb (1984) focuses on experiential learning, where knowing is a process of deriving knowing in action. Folk traditions are experiential, participatory and embedded in real life; thus, they have a good potential to improve learning results, especially in such areas as sustainability where it is necessary to adopt values in life. Similarly, Lev Vygotsky (1978) highlights the importance of cultural tools in cognitive development; folk practices are cultural tools, which allow individuals to achieve higher levels of understanding and social learning. These findings are also substantiated by international studies. Research on Education for Sustainable Development (e.g., Silva et al., 2023) have pointed out that indigenous knowledge modes are powerful engines of contextualized learning coverages, environmental ethics and relations to community, resulting in profound learning innovation. The seemingly low number (14.0 percent) reporting low impact may reflect limited participation or uneven implementation rather than the approach itself being ineffective.

Therefore, high and medium effects and a relatively high mean (3.74) show that folk traditions have the potential to significantly enhance sustainable learning results by promoting connectedness to nature in cognitive and value level learning for students.

Correlation between Use of Folk Traditions and Sustainable Education Outcomes

This part considers sustainable educational results in relation to the application of folk traditions.

Table 5: Correlation between Use and Outcomes (N = 200)

Variables	r-value	Significance (p-value)
Use of Folk Traditions & Sustainable Outcome	0.62	0.01

Source: Data compiled from primary survey conducted by the researcher (2026)
Finding: The coefficient of correlation r= 0.62, indicating a strong positive relationship between sustainable education outcome and the application of folk traditions. The result is statistically significant at the 0.01 level, implying that higher levels of inclusion of folk traditions in pedagogy lead to higher levels of sustainability learning outcomes.
Analysis: The result is statistically significant at the 0,01 level which indicates that we can be quite sure that it is a true correlation and not a case of randomness. This is corroborated by theoretical and empirical research especially in the Indian scenario where folk traditions are intricately linked with sustainability based knowing and doing.

At a policy level, National Education Policy 2020 recommends the inclusion of Indian Knowledge Systems (IKS), which encompasses folk traditions, within the framework of mainstream education to promote holistic and sustainable

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learning outcomes. Culturally based pedagogies foster learners' engagement and development of values, according to the policy. In the present study, the high correlation corroborates this sojourn as it suggests that sustainability learning would outcome in higher sense of using more and more of folk traditions.

Theoretically, the connection is read in terms of socio-cultural learning. Lev Vygotsky (1978)) why learning is a cultural and social process. Storytelling, proverbs and community rituals Folk traditions, in many manifestations, are powerful cultural tools for sustained and deeper learning that is cognitive and value based. Therefore, a natural corollary of increasing use of these traditions is enhancing educational outcomes, which is manifested in the positive correlation.

In the same vein, David Kolb (1984) stresses the importance of experiential learning, wherein knowledge is acquired through active involvement. Folk traditions offer contextual and experiential learning, particularly in education for sustainability, where the pertinence to lived-experience is paramount. This accounts for the fact that higher degrees of integration are associated with better learning outcomes. Madhav Gadgil and Ramachandra Guha from an Indian radical thinking who stressed that indigenous and folk knowledges are always aligned with ecological sustainability and resource management rather than the other way around. When this knowledge is embedded in pedagogy, it solidifies students' sense of place in the environment and ethical responsibility and results in quantitatively measurable improvements in sustainability outcomes. Moreover, Anil K. Gupta (2015) states that upon solutions to context-specific problems as well as a systems thinking approach to sustainability, the knowledge of grassroots innovations and traditions has a large part in solution-based thinking. His findings imply that combining these knowledge systems in education increases students' ability to engage with real-world problems, consistent with the strong relationship identified in this study.

This relationship is also supported by empirical evidence. Kumar (2022) found a positive association between integrating indigenous knowledge in education and students' environmental consciousness and academic participation. Sharma and Pandey (2023) also observed that the folk tradition-based classrooms were more participative and culturally internalized by the students leading to better learning. Therefore, this significant positive relationship implies that higher levels of pedagogical integration of folk traditions may enhance sustainability-oriented learning, including their potential for being a pedagogically effective tool to pursue such an agenda.

Discussion

This study explored the potential of folk traditions as instruments of sustainable education in a quantitative manner. The overall finding is that although awareness and use of folk tradition are moderate, its perceived effectiveness, learning influence and relation with sustainability education are high. Based on these results, it might be argued that there is an educational transition under way leading to a greater acknowledgement of folk traditions, but with an educational system not yet fully open to them. The moderate consciousness (Mean = 3.48) indicates that the participants were aware of folk traditions and that they had some knowledge but did not have further academic knowledge. This is reflective of a larger dialogue in Indian education where traditional know-how is culturally ingrained but not systemically embedded in formal schooling. The National Education Policy 2020 promotes the introduction of Indian Knowledge Systems (IKS), but it is yet to be executed. Anil K. Gupta (2015) is among the scholars who have argued that traditional knowledge is rich in communities but has not been assimilated into formal education systems, resulting in suboptimal awareness. Silva et al. (2023) point out that assimilation of indigenous knowledge is still sporadic worldwide, further validating the present findings.

The moderate mean level of use (Mean = 3.21) also suggests a similar position of non-use/hesitation. Although two-fifths of the respondents claimed to have made use of folk traditions on ad hoc basis, continuous incorporation is very minimal. This finding corroborates with the results of Kumar (2022) and Sharma and Pandey (2023) which suggest that teachers integrate folk elements in piecemeal rather than systematic manner.

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The transitional nature of implementation under the NEP 2020 also explains why usage is not yet on a larger scale. Conversely, the result indicates a high perceived efficiency value (M = 3.67) of folk tradition in the sustainable education. This tells us that folk tradition is seen as relevant and is perceived as a strong tradition. Theoretical support may be drawn from John Dewey (1938), who advocated experiential learning and Lev Vygotsky (1978), who stressed the importance of cultural tools in learning. Because it is experiential and culturally based, folk traditions naturally promote engagement and learning. Indian academicians Madhav Gadgil and Ramachandra Guha (1992) also maintain that traditional knowledge systems do contain ecological wisdom and therefore are indeed potent sources for sustainability education.

Sustainability impact (Mean= 3.74) The strong positive result for sustainable learning outcomes reveals that folk traditions promote students' environmental awareness and values, as well as their knowledge within the context. This echoes Gupta (2015) who discusses the importance of indigenous knowledge in contributing to sustainable thinking and problem solving. Empirical research (Kumar, 2022; Sharma & Pandey, 2023) also suggests better student participation and value inculcation via folk-based pedagogy.

Most interestingly, the analysis revealed a significant positive association (r = 0.62) between the application of folk traditions and sustainable learning outputs. This implies that further promotion of the use of folk traditions may have the potential to enhance learning performance. This this is paralleled theoretically by David Kolb (1984), who proposes experiential learning theory as a process of learning, through meaningful engagements with context-embedded experiences. It is also grounded on Vygotsky's socio-cultural theory which highlights the significance of cultural tools in cognitive development.

Taken as a whole, the discussions point to a sharp discrepancy between possibility and actuality. It should be noted that folk traditions are regarded as efficient and influential, but they are not widely used due to gaps in teacher training, dearth of curricular integration and institutional barriers. The findings indicate that a better implementation of policy, teacher education and curriculum design may promote the application of folk traditions in the teaching of sustainability-oriented education.

Testing of Hypotheses

The hypotheses were tested by means of correlation and descriptive statistics. The results showed a high positive correlation ($r = 0.62$, $p < 0.01$) between the application of folk traditions and sustainable education results, which is statistically significant at the 0.01 level. Hence, H_{01} was rejected and Ha_1 was accepted and it can be said that with the incorporation of folk traditions the sustainable learning outcome got better. Moreover, the descriptive results revealed the presence of very high averaged scores regarding the answers to the perceived effectiveness (M = 3.67) and sustainable learning (M = 3.74) items which means that folk traditions are perceived to have a positive impact on the knowledge, values and environmental awareness of students. The null hypothesis was rejected in favour of the alternative hypothesis. The findings are in line with theoretical views such as Lev Vygotsky (1978), who focuses on the use of cultural artifacts in learning and David Kolb (1984), who considers experiential learning as essential for shaping meaningful knowledge. Therefore, statistical evidence strongly supports the importance of folk traditions in sustainable education outcomes.

Educational Implications of the Study

This research has important consequences for learning in educational systems. The combination of moderate awareness and use with high perceived effectiveness and impact indicates it may be appropriate to consider the folk traditions for systematic inclusion within the school system. In pursuit of the NEP 2020, the curriculum makers need to integrate folk tales, indigenous wisdom and local cultural knowhow at the cross-curricular areas as a medium of sustainability-related learning. Pre-service education programmers need to be reformed to prepare teachers for teaching folk tradition in the school classroom. In addition, using folk traditions may encourage students to learn experientially,

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contextually and based on values which may lead to raised awareness of environment, cultural identity and critical thinking. Organizations need to promote community engagement and sharing of indigenous knowledge to connect formal and informal education systems. In sum, the research demonstrates that folk traditions have the power to reshape education as a more equitable, culturally responsive and sustainability-centred endeavour.

Limitations and Future Directions of the Study

The present study has limitations that should be taken into consideration. The sample size was capped at 200, thus the generalizability of the study findings to other educational setting might be limited. The study was predominantly based on self-report data which may be vulnerable to response bias. Moreover, this study was designed quantitatively, which may serve well to quantify trends and relationships, but not to capture the depth of experiences and the contextual nuances of applying folk traditions in teaching. It was also geographically and institutionally bounded, so it does limit generalization to a wider field. Larger and more varied samples, perhaps via cross-cultural comparisons, would be useful in extending the generality of the findings in future research. Mixed-method or qualitative methods would also be desirable for gaining further depth of understanding about how folk traditions are enacted and experienced in everyday classroom life. Future investigation could also include the role of technology to preserve and integrate folk traditions in contemporary pedagogy, as well as longitudinal research to analyze long-term impact on sustainable learning products.

Conclusion

The study concludes that folk traditions are effective educational tools in spreading education for sustainability and are quite well known and used, although they have a very high degree of impact and effectiveness. The high positive correlation between the use of folk traditions and sustainable learning outcomes proves the essential function of folk traditions in increasing students' knowledge, values and environmental awareness. Yet, although the present execution is still scattered, results show great promise in terms of integrating folk traditions in the general education system. Further promoting policy implementation, curriculum development and teacher training around these will also help to promote a more comprehensive, culturally grounded and sustainability-focused education system.

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RECLAIMING TRADITIONAL ECOLOGICAL KNOWLEDGE IN INDIAN KNOWLEDGE SYSTEMS: ROUTES TO ECOLOGICAL SUSTAINABILITY AND ENVIRONMENTAL EDUCATION

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Abstract: The growing environmental problems of the contemporary world have u within Indian Knowledge Systems (IKS) is the wisdom of generations accumulated over time on ecological processes, resource management, biodiversity conservation and environmental ethics. TEK, based on cultural traditions, spiritual beliefs and practical experiences, provides useful insights for addressing contemporary environmental challenges. This chapter elaborates the significance of Traditional Ecological Knowledge in Indian Knowledge Systems and their contributions towards ecological sustainability and environmental education. It points to indigenous conservation practices like sacred groves, traditional water harvesting systems, environmental ethics of Bishnoi community and sustainable agricultural practices of Apatani tribe. This chapter argues that these traditions provide concrete examples of sustainability and, at the same time, promote ecological responsibility and community participation. Moreover, the incorporation of traditional ecological perspectives in environmental education can foster environmental awareness, critical thinking and sustainable behaviour among learners. The chapter concludes with the view that reviving traditional ecological knowledge can strengthen sustainability efforts and help create environmentally responsible citizens capable of dealing with current ecological problems.

Introduction

Environmental sustainability is one of the most important problems of the twenty-first century. Rapid industrialization, urbanization, overexploitation of natural resources, loss of biodiversity and climate change have altered ecological systems worldwide. Many problems of environmental nature have been solved by scientific and technological progress but many problems of sustainability are still there. This has given rise to increasing interest among researchers in indigenous and traditional knowledge systems that have helped communities to live in harmony with nature over centuries.

Traditional Ecological Knowledge (TEK) is the knowledge, beliefs, practices and values that have been accumulated by local and Indigenous peoples over long periods of interaction with their environment (Berkes, 2018). In contrast to the frequently specialized nature of contemporary scientific knowledge, TEK is holistic, acknowledging the interconnectedness of the ecological, social, cultural, and spiritual dimensions of life. India possesses a rich tradition of ecological wisdom within its diverse cultural traditions. Indian Knowledge Systems include a wide range of areas such as philosophy, agriculture, medicine, architecture, astronomy and environmental management. The ancient Indian thought has always laid emphasis on the harmony between human beings and nature. It has always encouraged the responsible use of resources and respect for all forms of life. Such ecological values include sacred landscapes, traditional agricultural practices, water conservation systems and community-based resource management institutions. Recently, environmental education has come to realize the significance of incorporating indigenous and traditional knowledge into the learning process. Connecting students to local ecological practices and cultural traditions can help to make environmental education more relevant, meaningful and action-oriented. This chapter is concerned with the ecology of Indian Knowledge Systems. It explores the role of Traditional Ecological Knowledge in fostering ecological sustainability and environmental education.

Traditional Ecological Knowledge, Understanding and it's Foundation\

Traditional Ecological Knowledge is not a set of customs or beliefs. It is a living body of environmental knowledge learned through a cumulative process of observation and experience over generations. Berkes (2018) describes four

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interconnected aspects of TEK: (1) knowledge of ecological processes, (2) resource management practices, (3) social institutions, and (4) worldviews that shape the human-nature relationship. TEK is important because it is practical and adaptable. Traditional communities have generally evolved location-specific strategies that are well adapted to local environmental conditions. These strategies are tested over generations, and modified as ecological conditions change. Traditional ecological knowledge often includes ideas about sustainability, resilience and environmental stewardship. Philosophical and cultural traditions of Indian Knowledge Systems embodying ecological wisdom. Values such as Ahimsa (non-violence), Dharma (ethical duty) and Vasudhaiva Kutumbakam (the whole world is one family) promote respect for nature and underscore the interdependence of all living beings. These ideas promote an environmental ethic and are against an exploitative relationship to nature.

Traditional ecological knowledge can supplement modern scientific approaches to sustainability by offering locally appropriate solutions, community participation and long-term environmental perspectives (Gadgil, Berkes, & Folke, 1993). As environmental challenges become more complex, the combination of traditional wisdom and scientific knowledge may offer more holistic pathways to sustainability.

Ecological Foundations of Indian Knowledge Systems

Nature has traditionally been part of the existence of humans in Indian civilization and not an external force to be dominated. References to environmental ethics and ecological balance are plenty in ancient texts like the Vedas, Upanishads and Puranas. Often the earth is perceived as a caring mother that has to be respected and protected. Atharva Veda has hymns that thank the Earth and encourage the responsible utilization of natural resources. Also, Panchamahabhutas (the five elements – earth, water, fire, air and space) symbolize an ecological perspective of understanding the interrelationship between natural elements and human life. Such ideas demonstrate an awareness of environmental sustainability long before the contemporary environmental movement. Indian ecological thinking also emphasizes moderation and restraint in consumption. Traditional philosophies do not advocate unlimited exploitation of natural resources but rather balanced living and responsible use of natural resources. This view is consistent with the modern idea of sustainability which emphasizes the rights of future generations and the stewardship of nature.
Another example of the operation of ecological principles is found in the traditional agricultural systems of India. Traditionally, mixed cropping, crop rotation, organic manure, seed preservation and agroforestry have been used to maintain soil fertility, conserve biodiversity, and sustainable food production. These indigenous agricultural practices are said to contribute greatly to ecological resilience and cultural diversity (Shiva, 2005). The ecological underpinnings of Indian Knowledge Systems provide ethical and pragmatic ways to live sustainably. They are much in vogue in today's discussions about environmental sustainability.

Traditional Ecological Knowledge in India:

Sacred Groves, Community Conservation of Biodiversity: Sacred groves are one of the oldest and most successful examples of community conservation in India. These are patches of forests protected by local communities because of their religious, cultural or spiritual significance. Such places often place restrictions on activities like logging, hunting and resource extraction. Sacred groves act as reservoirs of biodiversity and provide habitat for a number of plant and animal species, as observed by Malhotra et al. (2001). In many areas, sacred groves harbour endemic and medicinal plant species that no longer occur in the surrounding landscapes. These groves also help to protect the soil, recharge groundwater and regulate the microclimate, as well as conserving biodiversity. The success of sacred groves shows how cultural values can be a strong driver for environmental conservation. These systems favour preservation by engaging the community and moral obligation rather than relying on external rules. Sacred groves offer important lessons on combining cultural traditions with environmental conservation in an era of rapid global biodiversity loss.

Bishnoi Community & Environmental Guardianship: The Bishnoi community of Rajasthan is well known for its commitment to environmental conservation. The Bishnoi tradition, founded by Guru Jambheshwar in the fifteenth

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century, is based on twenty-nine principles, some of which are dedicated to the protection of wildlife, forests and natural resources.

The most famous example of Bishnoi environmental ethics is the sacrifice of 1730 at Khejarli, when Amrita Devi and over three hundred villagers were killed trying to stop the cutting of the Khejri trees. This event is often considered as one of the first recorded environmental movements in history.

The Bishnoi community still protects wildlife species such as blackbucks and chinkaras, often providing food, water and shelter during periods of environmental stress. Their practices show how spiritual beliefs and community values can foster sustainable environmental behaviour. The Bishnoi example shows the potential of ethics and culture-based frameworks to promote conservation and ecological responsibility.

Apatani Agricultural System Indigenous Innovation for Sustainable Agriculture: The Apatani tribe of Arunachal Pradesh has evolved one of India's most sophisticated indigenous agricultural systems. The Apatani system of farming in Ziro Valley is a symbiotic combination of paddy rice cultivation and fish aquaculture for maximum productivity with minimum ecological disturbance. The Apatani system is different from many modern agricultural systems that depend heavily on chemical fertilizers and pesticides, and instead uses organic waste, natural nutrient cycling and community-based water management. Researchers have observed the ecological efficiency of the system for soil fertility maintenance, water conservation and food security (Dutta & Dutta, 2005). Careful channelling of water from the surrounding hills irrigates agricultural fields, ensuring optimum utilization of available resources. Rice-grown fish add nutrition, income and pest control. The Apatani landscape's international recognition by conservation organizations illustrates the global significance of indigenous ecological practices. The system shows how traditional knowledge can offer sustainable solutions appropriate to the local environment. In an age where modern agriculture is confronted with issues such as soil degradation, water scarcity, and biodiversity loss, the Apatani model provides useful lessons on sustainable food production.

Conventional Water Harvesting Systems, Indigenous views on water security: Water conservation has been a part of the Indian ecological traditions since time immemorial. In different parts of India, local communities developed water harvesting systems suited to their climatic and geographical conditions. These include johads of Rajasthan, baolis and step wells of North India, tanks of South India, bamboo drip irrigation of Meghalaya and ahar-pyne systems of Bihar. Traditional water harvesting systems were designed to store water but also to recharge ground water, control floods and build resilience to drought. Agarwal and Narain (1997) have documented many of these indigenous technologies that have sustained water management for centuries prior to the advent of centralized infrastructure systems.

They work because they are combined with local ecological knowledge. Through long term observation and experience, communities had learned about rainfall patterns and soil properties, and how watersheds behave. And maintenance and management were therefore often organized collectively, to encourage community participation and stewardship of resources.

With the contemporary water crises in many parts of India, the traditional systems have again come to the limelight. Their revival points to the potential role historical ecological knowledge can play in contemporary sustainability initiatives, and in reducing dependence on resource demanding technological fixes.

Sustainability and Traditional Ecological Knowledge Ecology: Traditional Ecological Knowledge is an important contribution to ecological sustainability and is based on long term interactions between communities and their environments. Unlike short-term resource extraction models, TEK emphasizes ecological balance, intergenerational responsibility, and adaptive resource management. TEK is a major contributor to biodiversity conservation. Many Indigenous communities have detailed knowledge of local plants and animals, seasonal cycles and relationships within ecosystems. Such knowledge also helps to develop sustainable harvesting practices and prevent overexploitation of

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natural resources. As stated by Gadgil, Berkes and Folke (1993), indigenous knowledge systems are often powerful mechanisms for biodiversity conservation because they are closely intertwined with cultural values and community institutions. TEK also supports climate resilience. Traditional agricultural practices like mixed cropping, agroforestry and seed preservation are better at building resilience in communities to environmental variability. Different farming systems reduce vulnerability to pests, diseases and climatic uncertainties and maintain ecosystem stability.

An important part of TEK is environmental ethics. Indian ecological traditions say of restraint, responsibility and respect of nature. Such ethical principles foster sustainable behaviour and challenge consumerist attitudes that contribute to environmental degradation. Traditional systems are based on ecological knowledge and cultural values which are the foundation for long-term sustainability.

Moreover, TEK promotes public participation in environmental governance. Resource management decisions often are made by groups, which provides for accountability and shared responsibility. Such participatory approaches are well suited to modern frameworks of sustainability, which emphasize stakeholder engagement and decentralization of governance.

Implications for Environmental Education: Environmental education is intended to develop the awareness, knowledge, attitudes and skills that will enable people to participate in sustainability efforts. Integrating Traditional Ecological Knowledge into environmental education can do much to enhance these objectives.

First, TEK provides an opportunity for place-based learning. Students can investigate local ecosystems, traditional practices, and community experiences that are directly relevant to their environmental contexts. This type of learning makes learners more involved and helps them to see sustainability as something lived, not an abstract concept.
Second, TEK promotes interdisciplinary learning about ecological, cultural, social and ethical dimensions of environmental problems. Learners gain a comprehensive understanding of sustainability, encompassing values, traditions and community practices, as well as scientific facts.

Third, Indigenous ecological knowledge can foster environmental stewardship. Students develop a deeper sense of environmental responsibility as they learn about how communities for generations have protected forests, conserved water and managed biodiversity. UNESCO (2017) states that education for sustainable development should enable learners to make informed decisions and act responsibly to promote environmental integrity and social justice.

The National Education Policy (NEP) 2020 further promotes the integration of Indian Knowledge Systems into education. Hence, the inclusion of TEK in curricula can enhance culturally responsive pedagogy, as well as reinforce sustainability education.

Field visits, community interaction programmes, local biodiversity studies, oral history projects and interdisciplinary teaching approaches can be used to incorporate traditional ecological knowledge into educational institutions. Projects like this will help bridge the gap between traditional knowledge and current environmental issues.

Future Perspectives and Challenges: Traditional Ecological Knowledge, however, is not without its challenges. Urbanization, globalization, changing lifestyles and the spread of market economies have put pressure on traditional ways of life, and on the passing down of knowledge between generations. Young people have little chance to experience the ecological practices that used to be part of community life.

The marginalization of indigenous perspectives is also linked to the dominance of formal scientific knowledge systems. While evidence exists for the ecological effectiveness of traditional knowledge, it is sometimes viewed as antiquated or unscientific. Such perceptions are an obstacle to its integration into policy, research and education systems.

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Another challenge is about the documentation and preservation of traditional knowledge. Much of this knowledge is oral and is at risk of being lost as elders die and cultural practices fade. Hence, systematic efforts of documentation are required for the preservation of ecological heritage.

The future is bright for TEK. Growing awareness of sustainability challenges has prompted a renewed interest in indigenous knowledge systems. Policymakers, researchers and educators are increasingly recognising the importance of integrating traditional and scientific approaches to environmental management.

Educational reforms that incorporate Indian Knowledge Systems provide new avenues for the revival of traditional ecological knowledge. Collaboration with local communities, educational institutions and government agencies through joint research can provide additional support for the preservation and application of TEK. Such efforts can help develop more inclusive, culturally relevant and sustainable approaches to solving environmental problems

Conclusion

Traditional Ecological Knowledge (TEK) embedded in Indian Knowledge Systems (IKS) is a treasure trove of environmental wisdom which is very much relevant in addressing the issues of modern sustainability. Indian communities have demonstrated sustainable practices of caring for resources and the environment through the preservation of sacred groves, the Bishnoi environmental ethic, the Apatani system of agriculture, and traditional methods of water harvesting.

These traditions stress the value of seeing humans as part of ecological systems rather than as external controllers of nature. Their focus is on biodiversity conservation, community participation, ethical responsibility and sustainable resource management, all of which closely align with the goals of modern sustainability.

Traditional Ecological Knowledge may be a valuable avenue for the conservation and revitalization of Environmental Education. Educational institutions play an important role in promoting environmental awareness, cultural recognition and sustainable behaviour among learners through the integration of local ecological traditions in teaching and learning processes. The future of sustainability may depend not only on technological innovation but also on the ability to learn from and adapt the ecological wisdom embedded in traditional knowledge systems.

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THE ROLE OF ORGANIC FARMING IN ACHIEVING AGRICULTURAL SUSTAINABILITY: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

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Abstract: Agriculture is the foundation of human civilisation, supplying food, jobs, and raw materials for a variety of businesses. However, traditionalagricultural methods have been increasingly linked to environmental degradation, soil fertility loss, water pollution, biodiversity decrease, and climate change.In response to these issues, organic farming has arisen as a longterm agricultural practice that prioritises ecological balnce, resource conservation, and socioeconomic wellbeing.Organic farming does not use synthetic fertilisers, pesticides, genetically engineered organisms, or growth regulators, instead fostering natural processes and biodiversity.This research study investigates the role of organic farming in attaining agricultural sustainability by examining its environmental and socioeconomic consequences.The study focuses on how organic farming improves soil health, water conservation, biodiversity, climate change mitigation, rural employment, income production, and food security.Despite certain limitations, such as reduced yields during transition periods and higher certification costs, organic farming offers a potential path to sustainable agriculture and rural development.

Introduction

Agriculture is critical to global food security and economic prosperity. The Green Revolution dramatically enhanced agricultural output by utilising chemical fertilisers, herbicides, high yielding cultivars, and irrigation systems. Although these technologies helped to increased food production, they also caused significant environmental and socio economic concerns. Excessive chemical inputs have caused soil deterioration, groundwater pollution, biodiversity loss, and increased greenhouse gas emissions. Furthermore, reliance on external inputs has increased production costs and lowered profitability in small scale farming. These issues have spurred academics, governments, and farmers to look for sustainable alternatives.

Organic farming has evolved as a very successful way to sustainable agriculture. It is based on ecological principles that promote soil fertility, protect natural resources, and keep ecosystems healthy. Organic farming aims to create a healthy relationship between agriculture and the environment while also assuring economic viability and social justice. The notion of sustainable agriculture includes environmental sustainability, economic profitability, and social responsibility. Organic farming benefits all three aspects by lowering environmental harm, increasing farmer livelihoods, and encouraging healthy food production. This research investigates the role of organic farming in attaining agricultural sustainability and assesses its environmental and socioeconomic implications.

Objectives of the Study

1.To analyze the environmental impacts of organic farming.
2.To evaluate the socio-economic impacts of organic farming.
3.To assess the contribution of organic farming to agricultural sustainability.
4.To identify challenges and future prospects of organic farming.

Environmental Impacts of Organic Farming

1.Improvement of Soil Health**:** Organic farming boosts soil health by increasing organic matter, boosting microbial diversity, and encouraging natural nutrient cycling. Compost, green manure, crop rotation, and organic leftovers increase soil structure, water retention, and fertility. These measures help to decrease soil erosion while also supporting long-term agricultural output.

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2. Improved Farmers' Income: Organic farming may boost farmers' revenue by lowering their reliance on synthetic fertilisers, pesticides, and other chemical inputs. Organic products frequently command higher pricing in domestic and international markets due to rising customer demand. Diversified agricultural methods, value added goods, and direct selling options increase profitability, providing farmers with consistent profits and long-term economic viability.

3. Rural Development: Organic farming supports rural development by promoting: Local Entrepreneurship Value added processing. Community Based Enterprises Sustainable livelihoods. The expansion of organic markets opens up new options for rural areas and boosts local economies.

4.Food Security: Organic farming helps to improve food security by boosting sustainable agricultural output, increasing soil fertility, saving water, and minimising reliance on synthetic inputs. It increases biodiversity and boosts ecosystem resilience, resulting in long term food production stability. Organic farming contributes to a more secure and sustainable food supply by promoting local food systems and producing nutritious, chemical-free goods.

5.Human Health Benefits: Reducing or eliminating the usage of synthetic pesticides reduces farmers' and consumers' exposure to potentially dangerous chemicals. The potential health advantages include: Reduced pesticide residues in food. Improved workplace safety. Better environmental health. Improved food quality Consumers are increasingly choosing organic products owing to worries about food safety and health.

6.Empowerment of Small Farmers: Organic farming helps small farmers by minimising their reliance on expensive chemical inputs and encouraging the use of locally accessible resources. It boosts soil fertility, increases crop resilience, and opens up premium markets for organic products. Small farmers may enhance their income, boost their food security, and establish sustainable livelihoods through training, farmer cooperatives, and government assistance.

7.Strengthening Local Economies: Organic agriculture promotes local production and consumption patterns. The economic benefits include:
Increased local spending
Development of local marketplaces
Promotion of Agricultural Tourism Growth of small firms
These elements help to drive regional economic growth. Organic Farming and Agricultural Sustainability
Agricultural Sustainability Based on the Three Pillars

Agricultural sustainability is founded on three interconnected pillars:

- **Environmental Sustainability**
- **Economic Sustainability,** and
- **Social Sustainability**.

These pillars ensure that agriculture remains productive, profitable, and beneficial for society while protecting natural resources for future generations.

1. **Environmental Sustainability**

   This pillar focuses on protecting natural resources and reducing environmental damage. This includes:
   Keeping the soil fertile and healthy. Efficient irrigation helps to conserve water resources.
   Reducing contamination from chemical fertilisers and pesticides.

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Promoting biodiversity and ecological equilibrium.
Mitigating climate change via sustainable farming techniques.

2. **Economic Sustainability**
   Economic sustainability guarantees that farming is lucrative and financially feasible for farmers.
   This includes:A steady and enough agricultural income.Efficient use of resources and inputs.
   Increased production and profitability.
   Access to markets and reasonable pricing for agricultural products.
   Long term economic resilience against market swings.

3.**Social Sustainability**
   This pillar focuses on the well-being of farmers, labourers, and rural communities.
   This includes: Enhancing food security and nutrition.
   Ensuring safe and equitable working conditions.
   Supporting rural lives and employment.
   Maintaining traditional agricultural knowledge and culture.
   Promoting Equity, Social Justice, and Community Development

Organic farming offers a complete framework for longterm agricultural growth by combining environmen tal, economic, and social goals. Challenges in Organic Farming. Despite its benefits, organic farming faces several challenges.

1. **Lower Yields During the Transition**: Farmers who transition from conventional to organic systems may endure temporary output decreases until soil fertility and ecological balance are restored.
2. **Certification Costs:** Organic certification can be expensive and complex, particularly for small-scale farmers.
3. **Market Access Constraints:**
   Limited infrastructure and marketing channels may limit entry to organic markets.
4. **Knowledge and Training Requirements:** Organic farming necessitates specialised knowledge regarding:
   Soil management Pest Control Crop diversification Certification Standards
   Many farmers require technical help and training.
5. **Labor Intensity:** Organic farming frequently necessitates extra labour, which may raise production prices in areas where labour supply is restricted.
6. **Limited Availability of Organic Inputs:** Access to high-quality organic seeds, compost, and biofertilizers can be challenging in some regions.

Future Prospects of Organic Farming

1. Growing Consumer Demand
   There is an increasing desire for food items that are healthful, devoid of chemicals, and ecologically friendly.
2. Government Support
   Increased subsidies, training programs, certification help, and legislative support for organic producers
3. Expansion of Organic Markets
   Growing domestic and worldwide market prospects for organic products.
4. Higher Income Potential - Premium prices for organic products can boost farmers' profits.

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5. Technological advancements include biofertilizers, biopesticides, and precision agricultural technolo gy.
6. Climate Change Mitigation: Organic farming reduces greenhouse gas emissions and increases carbon sequestration. Improved Soil Health –
7. Continued adoption of organic methods increases soil fertility and long-term production.
8. Biodiversity Conservation - Encourages the preservation of beneficial insects, wildlife, and natural habitats.

Conclusion

Organic farming promotes agricultural sustainability by increasing soil fertility, maintaining biodiversity , decreasing pollution, safeguarding water resources, and mitigating climate change.Despite ongoing obs tacles like as reduced yields and management complications, organic farming's environmental advantage s make it an important component of sustainable agriculture.Organic farming promotes longterm food se curity by incorporating ecological principles into agricultural production while conserving natural resour ces for future generations.As global environmental concerns rise, organic farming is expected to become a more essential technique for ensuring sustainable agricultural growth.

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REVIVING INDIGENOUS WATER CONSERVATION PRACTICES FOR SUSTAINABLE MANAGEMENT OF THE JOJARI RIVER IN THE SALAWAS REGION, RAJASTHAN: AN INDIAN KNOWLEDGE SYSTEM (IKS)-BASED APPROACH

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Abstract: The Jojari River, flowing through the Salawas region of Rajasthan, is confronted with a complex web of ecological crises progressive water depletion, severe industrial pollution, and rapid biodiversity decline all accelerated by unchecked urbanization and groundwater over extraction. This study proposes a culturally grounded and ecologically viable restoration strategy rooted in Indian Knowledge Systems (IKS), advocating for the systematic revival of indigenous water harvesting structures such as Johads, Baoris, Taankas, and Khadins. Drawing on a mixed-methods research design that integrates GIS-based site suitability mapping, MODFLOW hydrological modeling, and participatory stakeholder engagement, the study synthesizes evidence from comparable restoration initiatives across Rajasthan to project realistic outcomes for the Jojari basin. Findings indicate that IKS-based interventions can facilitate groundwater recharge in the range of 7.91 to 12.50 million gallons per day, reduce pollution-related heavy metal indices by 20 to 46 percent through enhanced natural filtration, and create ecological conditions supportive of at least 40 avifaunal species. The study further anticipates a reduction in groundwater table decline of 25 to 50 percent over the intervention period. By bridging ancestral wisdom with contemporary hydrological and ecological science, this research offers a replicable, community-driven model for sustainable water governance in arid and semi-arid regions of India.

Introduction

Rajasthan, India's largest and most water-stressed state, sits predominantly within the arid and semi-arid climatic zone of the Indian subcontinent. Its fragile ecological balance is perpetually threatened by the dual pressures of an intensifying climate and rapidly expanding human demands on natural resources. Within this landscape, the Jojari River a seasonal watercourse traversing the Salawas region near Jodhpur embodies the cumulative consequences of ecological neglect. Once a life-giving artery for agricultural communities and a thriving habitat for diverse flora and fauna, the river has steadily degraded into a conduit for industrial and municipal wastewater, a stark symbol of environmental mismanagement in an already resource-scarce region.

The hydrological vulnerability of the Jojari basin is well-documented. Annual precipitation in the region ranges between 300 and 400 mm, concentrated almost entirely within the monsoon months of July through September (Maanju, 2014). However, erratic rainfall patterns, compounded by high evapotranspiration rates typical of desert-margin climates, result in minimal natural groundwater recharge. In critical aquifer zones, depletion rates have been recorded at 1 to 2 meters annually a trajectory that, if unchecked, threatens to render the basin hydrologically non-functional within a foreseeable horizon (Maanju, 2013). Simultaneously, industrial discharges predominantly from Jodhpur's textile and chemical processing industries have introduced alarming concentrations of heavy metals, including cadmium (Cd), lead (Pb), and chromium (Cr), into the river system. Studies have revealed that the Water Quality Index (WQI) of Jojari's waters ranges between 62 and 164, rendering them unfit for irrigation or domestic use, while the Heavy Metal Pollution Index (HPI) reaches values between 26,074 and 84,547 figures that exceed Bureau of Indian Standards (BIS) permissible limits by factors of tens of thousands (Kachhwaha et al., 2022).

Against this backdrop of ecological deterioration, Indian Knowledge Systems (IKS) offer a historically validated and contextually relevant pathway to restoration. Rooted in centuries of lived experience in water-scarce landscapes, IKS encompasses a rich repertoire of indigenous hydraulic structures Johads, Baoris, Taankas, and Khadins each

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engineered through generations of observation and refinement to capture monsoon runoff, replenish local aquifers, and sustain agricultural and domestic water needs through dry seasons (Journals, 2018). These systems are not merely technical artifacts; they are embedded in the social and spiritual fabric of Rajasthani communities, sustained by collective labor, communal governance, and an ethos of ecological stewardship. Their revival, therefore, is simultaneously a hydrological intervention and a cultural reclamation.

The literature on IKS in arid India provides compelling evidence for their efficacy. In the Arvari River catchment of Rajasthan, the strategic deployment of check dams and bunds analogous to traditional Johads was found to enhance the hydrological sustainability of the catchment by moderating the balance between groundwater recharge and abstraction (Glendenning & Vervoort, 2010). In the degraded hill landscapes of the Aravali range, rainwater harvesting structures paired with afforestation initiatives yielded measurable gains in both groundwater storage and soil carbon sequestration (Grewal, 2017). GIS-based multicriteria analyses conducted across Rajasthan have further demonstrated that approximately 3.6 to 8.2 percent of the landscape presents high-to-moderate suitability for traditional harvesting structures, with land use, vegetation cover, and slope emerging as primary determinants of site viability (Rawat et al., 2023).

Despite this growing body of evidence, no integrated study has yet examined the Jojari River specifically through the lens of IKS revival, linking hydrological restoration with pollution mitigation, biodiversity recovery, and community participation within a single interdisciplinary framework. This research addresses that gap. By combining GIS-based spatial analysis, MODFLOW groundwater modeling, participatory rural appraisal, and a systematic synthesis of analogous Rajasthan case studies, the study develops and proposes a comprehensive IKS-based conservation framework tailored to the ecological and socio-cultural realities of the Salawas region. In doing so, it aspires not only to offer a practical restoration roadmap for the Jojari basin but also to contribute a scalable model for indigenous water governance applicable to arid regions across India and beyond.

Objectives

The overarching aim of this study is to design and propose an Indian Knowledge Systems-based framework for the sustainable ecological and hydrological restoration of the Jojari River in the Salawas region, Rajasthan. The study seeks to demonstrate how the structured revival of indigenous water conservation practices can simultaneously address groundwater depletion, heavy metal pollution, and biodiversity decline, while reinforcing community ownership of water resources. To achieve this overarching aim, the following specific objectives guide the inquiry:

- To systematically assess the hydrological and ecological challenges confronting the Jojari River, with particular focus on groundwater depletion rates, water quality degradation, and biodiversity stress.
- To document, analyse, and evaluate the functional efficacy of traditional IKS practices — specifically Johads, Baoris, Taankas, and Khadins — in the context of water harvesting and aquifer recharge, drawing on comparative evidence from analogous Rajasthan systems.
- To develop and apply a mixed-methods methodology incorporating GIS-based suitability mapping, MODFLOW hydrological modeling, and participatory stakeholder engagement to identify optimal IKS implementation sites within the Salawas region.
- To synthesize and quantify outcomes from comparable rainwater harvesting initiatives across Rajasthan, including projected recharge volumes, improvements in water quality, and ecological recovery indicators.
- To propose a novel, interdisciplinary conservation framework that integrates IKS with contemporary scientific tools, emphasizing community-driven governance for long-term sustainability.
- To project expected outcomes of the proposed interventions, including a 25 to 50 percent augmentation in groundwater recharge, a measurable reduction in heavy metal pollution indices, and the sustained support of diverse avifaunal and aquatic communities.

Study Area

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The study area encompasses the Jojari River basin and its surrounding Salawas region, located in the Jodhpur district of Rajasthan, covering an area of approximately 400 square kilometres. The river originates in the northern uplands of the district and flows southward over roughly 60 kilometres before dissipating into seasonal drainage networks. The region falls within the transitional zone between the Thar Desert and the semi-arid plains of western Rajasthan, a landscape defined by its climatic extremes and ecological sensitivity.

Climatically, the area receives between 300 and 450 mm of annual rainfall, overwhelmingly concentrated during the monsoon season spanning July to September. Temperatures oscillate between near-freezing winter nights and scorching summer maxima exceeding 45°C, placing extraordinary physiological stress on both human populations and natural ecosystems. The terrain is characterised by undulating sand dunes, isolated rocky outcrops, and intermittent alluvial plains. Soils are predominantly sandy loam in texture — a composition that, while naturally low in cohesion and infiltration capacity, responds well to the structural interventions of traditional water harvesting systems (Rawat et al., 2023).

The Jojari is an ephemeral river, sustaining surface flow only during and immediately following monsoon events. Its shallow alluvial aquifer system, which historically provided a seasonal buffer for agricultural and domestic water needs, has been progressively depleted by intensive tube-well extraction. Over 90 percent of irrigation in the basin is now dependent on groundwater, and water table levels have declined at an annual rate of 1 to 2 metres (Maanju, 2013). The hydrological stress is compounded by industrial contamination: water quality assessments of the Jojari have returned WQI values between 62 and 164 — classifying the water as poor to very poor — while HPI measurements between 26,074 and 84,547 confirm severe heavy metal loading, far exceeding safe benchmarks set by international and national standards (Kachhwaha et al., 2022).

Ecologically, the Jojari's wastewater wetland, despite its degraded state, supports a surprisingly rich avifaunal assemblage of 40 species across 11 taxonomic orders. Winter migratory species such as the Common Sandpiper are among the seasonal inhabitants, though continued habitat deterioration and chemical contamination pose mounting threats to these populations (Das & Tripathy, 2020). Freshwater fish populations, including the Common Carp, face additional pressure from altered seasonal flow regimes and episodic drought conditions (Jhajhria, 2017).

The socio-cultural landscape of Salawas is shaped largely by Bishnoi and Rajput communities, whose traditional value systems historically incorporated a deep reverence for water and nature. Land use across the basin is heterogeneous: approximately 40 percent is under agriculture (primarily millets and pulses), 30 percent comprises scrubland and degraded rangeland, and 20 percent reflects the encroachment of urban expansion, which has intensified surface runoff and accelerated soil erosion. GIS analyses of the basin confirm moderate overall suitability for rainwater harvesting structures, with slope gradients of 2 to 5 percent, drainage density, and normalized difference vegetation index (NDVI) values serving as the primary spatial determinants of site viability (Rawat et al., 2023).

Indian Knowledge Systems and Water Conservation

Indian Knowledge Systems represent a vast and largely uncodified body of ecological intelligence — one developed not in laboratories or universities, but through generations of intimate human engagement with the land, water, and seasons of the subcontinent. In the arid landscapes of Rajasthan, where survival has always depended on the ability to capture, store, and judiciously distribute the scarce monsoon gift, this knowledge crystallised into a suite of ingenious hydraulic structures, each adapted to the specific geomorphological and hydrological conditions of its local context. Far from being mere engineering artifacts, these systems are living expressions of a philosophy that regards water not as a commodity but as a communal inheritance to be safeguarded across generations.

Johad: The Johad is perhaps the most iconic of Rajasthan's traditional water conservation structures — an earthen embankment, typically square or rectangular in plan, built across seasonal streams and drainage channels to impound monsoon runoff. These structures, which range from 2 to 5 metres in height and 50 to 100 metres in width, function

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primarily as percolation reservoirs, allowing impounded water to seep gradually into the underlying aquifer rather than being lost to evaporation or downstream flow. Historical records document their construction during periods of acute climatic stress, including the Chhapniya famine of the early twentieth century, when Johads served both as community lifelines and as expressions of collective resilience (Journals, 2018).

Comparative hydrological assessments from the Arvari River catchment in Rajasthan — a system geographically and climatically analogous to the Jojari basin — have demonstrated that Johad-type structures can significantly enhance the sustainability of local groundwater systems by moderating the balance between seasonal recharge and year-round extraction demands (Glendenning & Vervoort, 2010). When combined with afforestation programmes on the surrounding catchment slopes, Johads have been shown to facilitate soil carbon sequestration rates of up to 5.24 tonnes per hectare per year, contributing to both hydrological and atmospheric benefits (Singh, 2017). For the Jojari basin, it is estimated that a network of strategically sited Johads could capture 10 to 15 percent of annual monsoon runoff, directly offsetting the 1 to 2 metre annual groundwater decline currently observed (Maanju, 2013). Importantly, Johads also embody the principle of collective stewardship: in Bishnoi tradition, their construction and maintenance are community endeavours, ensuring that the benefits of recharge are equitably distributed across the social fabric.

Baori (Stepwell): The Baori, or stepwell, represents a more architecturally sophisticated variant of indigenous water infrastructure — a multi-tiered subterranean structure that provides direct access to groundwater while simultaneously functioning as a surface water harvesting facility. Rajasthan's Baoris are renowned for their intricate stone craftsmanship and their historical role as social gathering spaces, where women collected water and communities convened. Beyond their cultural significance, Baoris serve a critical hydrological function: their stepped walls create natural filtration zones, through which surface runoff percolates and is progressively cleansed before reaching the water table. Comparative studies from arid regions indicate that Baoris can enhance local groundwater recharge by 15 to 20 percent and provide meaningful dilution of dissolved contaminants through sedimentation and natural filtration processes (Rawat et al., 2023). In the context of the Jojari basin — where HPI values in excess of 84,000 reflect extreme heavy metal contamination (Kachhwaha et al., 2022) — the natural filtration capacity of restored Baoris holds particular promise. Additionally, the microhabitat conditions created by stepwell environments — cool, shaded, and consistently moist — can support aquatic invertebrates and provide supplementary habitat for avifauna already documented in the Jojari wetland (Das & Tripathy, 2020). Their long-term viability, as evidenced by Rajasthani heritage, depends on the reinstitution of community-based governance mechanisms such as the traditional Pani Panchayat system, which historically assigned collective responsibility for maintenance and equitable water distribution.

Taanka: The Taanka is a closed, underground rainwater cistern, typically constructed beneath courtyard floors or adjacent to rooftops, designed to intercept and store monsoon precipitation for use during the extended dry season. In the desert villages of Rajasthan, Taankas with storage capacities ranging from 5,000 to 10,000 litres have historically provided households with 20 to 40 percent of their annual domestic water requirements, reducing dependence on open wells and distant water sources (Grewal, 2017). Because Taankas are sealed and shaded, evaporative losses are minimal, and stored water remains relatively clean and cool — a critical advantage in a region where surface water quality is severely compromised.

Modelling studies of comparable decentralised harvesting systems in other South Asian cities indicate that community-scale Taanka networks can reduce municipal water demand by approximately 20 percent (Mamun et al., 2023). In the Salawas context, scaling up household and institutional Taanka installation could collectively yield an estimated 4,000 to 6,000 litres per unit annually, simultaneously easing pressure on the already overexploited Jojari aquifer. This reduction in extraction would indirectly benefit riverine biodiversity by maintaining higher base flows and attenuating the hydrological extremes that currently threaten fish populations and wetland-dependent bird species.

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Khadin: The Khadin is a uniquely Rajasthani innovation in agricultural water management — a long earthen bund, or embankment, constructed across gently sloping terrain to impound monsoon runoff within the bunded field. Unlike the Johad, which prioritises groundwater recharge, the Khadin is primarily designed to retain moisture within the field profile for the duration of the kharif cropping season, enabling the cultivation of millet, pulses, and other dryland crops in otherwise inhospitable conditions. In addition to their agricultural function, Khadins facilitate recharge through infiltration from the temporarily inundated field surface, and their bunds retard sediment and pollutant transport, providing a degree of natural water quality management downstream. Evidence from the Jodhpur district and the Aravali hill watershed confirms that Khadins consistently deliver yield improvements of 50 percent or more over unmanaged dryland plots, while sequestering approximately 1.28 tonnes of carbon per hectare annually (Singh, 2017). A watershed-scale assessment of 16 earthen dam-type structures in the Aravali hills documented sustained augmentation of groundwater stores with a total investment yielding 41.75 lakh rupees in measurable hydrological benefits (Grewal, 2017). For the Jojari basin, the placement of Khadins in upstream agricultural zones could simultaneously improve food security for farming communities, reduce sediment and contaminant loading to the river, and contribute to the recovery of aquatic habitats currently under stress from sedimentation and low dry-season flows (Jhajhria, 2017). Taken together, these four IKS structures — Johad, Baori, Taanka, and Khadin — constitute a complementary system of water management that operates across multiple scales, from the household to the watershed. Their collective potential for the Jojari basin, extrapolating from analogous case studies, includes groundwater recharge volumes comparable to the 2,489 million cubic metres annual potential identified in similarly characterised South Indian river basins (Aju et al., 2021), as well as documented community governance benefits drawn from indigenous water management traditions across the South Asian region (David & Ploeger, 2014; Lodhiyal, 2011).

Ecological Problems of the Jojari River

The ecological crisis confronting the Jojari River is neither recent nor isolated — it is the cumulative product of decades of industrial growth, policy neglect, and the erosion of traditional conservation practices in a region already operating at the margins of ecological viability. Understanding the depth and interconnectedness of these problems is essential to appreciating why a holistic, IKS-grounded restoration approach is not merely preferable, but necessary.

Industrial Pollution and Water Quality Degradation: The most acute and visible dimension of Jojari's ecological crisis is its contamination by industrial effluents. Jodhpur's thriving textile dyeing and chemical processing industries discharge substantial volumes of inadequately treated wastewater into the river system. Comprehensive water quality assessments have documented WQI values between 62 and 164 across Jojari sampling sites, placing the water firmly in the poor to very poor category and rendering it unsuitable for either irrigation or drinking purposes. More alarming still are the heavy metal pollution measurements: HPI values ranging from 26,074 to 84,547 — exceeding WHO and BIS permissible thresholds by factors of thousands — confirm the presence of toxic concentrations of cadmium, lead, chromium, nickel, zinc, and copper in the river water and sediments (Kachhwaha et al., 2022). Long-term exposure to these contaminants through irrigated food crops and contaminated groundwater poses significant carcinogenic and neurological health risks to communities in the surrounding agricultural zones.

Groundwater Depletion: Beneath the surface of the Jojari valley, an equally serious crisis unfolds in the form of accelerating groundwater decline. The region's shallow alluvial aquifer, historically recharged through seasonal river flow and surface infiltration, has been subjected to extraction rates that consistently outpace natural replenishment. Groundwater levels have dropped at a rate of 1 to 2 metres per year — a trajectory that, projected over two decades, suggests a decline of approximately 201 mm per year without corrective intervention (Maanju, 2013). The situation is further exacerbated by land use changes: the replacement of permeable scrubland and traditional field bunds with paved surfaces and intensified agriculture has reduced infiltration and accelerated surface runoff, diminishing the natural recharge contribution of monsoon rainfall. Comparative analysis from the Arvari catchment demonstrates that the absence of rainwater harvesting infrastructure can reduce aquifer sustainability by as much as 50 percent relative to managed systems (Glendenning & Vervoort, 2010).

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Biodiversity Loss: The ecological impacts of Jojari's degradation extend well beyond the river itself, reverberating through the wetland and riparian communities that depend on it. Despite its heavily polluted state, the Jojari's wastewater wetland supports a notable avifaunal assemblage of 40 species spanning 11 taxonomic orders, including several migratory species that use the site as a critical wintering ground (Das & Tripathy, 2020). However, the ongoing deterioration of water quality and habitat structure threatens to progressively erode this ecological value. Freshwater fish communities — including the Common Carp and several native species — face compound pressures from altered flow regimes, episodic drought, and the bioaccumulation of heavy metals in aquatic food chains (Jhajhria, 2017). Arthropod communities, which underpin the ecological functioning of semi-arid agro-ecosystems, have also been shown to decline significantly in the absence of water conservation and vegetation management (Norfolk et al., 2012).

Climate Change and Systemic Vulnerability: Overlying these acute anthropogenic pressures is the longer-term uncertainty introduced by climate change. Regional climate projections for western Rajasthan indicate a 10 to 20 percent increase in rainfall variability over coming decades — an outcome that will likely intensify both the severity of droughts and the unpredictability of monsoon-season floods. This dual dynamic will place additional stress on an already overextended hydrological system, reducing effective recharge while increasing the risk of flash flooding and erosion. Simultaneously, rising temperatures will accelerate evapotranspiration, further shrinking the window of effective soil moisture availability for both agriculture and ecological functions. The compounding of soil erosion, salinisation, and carbon stock depletion in unmanaged areas underscores the urgency of restorative intervention — and the inadequacy of piecemeal, single-sector approaches (Singh, G., 2017).

Methodology

This study employs a mixed-methods research design, deliberately constructed to capture the full complexity of the Jojari River's ecological, hydrological, and socio-cultural challenges. By integrating quantitative spatial and hydrological analyses with qualitative community-centred inquiry, the methodology ensures that the proposed IKS framework is simultaneously technically rigorous and contextually grounded.

The research begins with a systematic literature synthesis, drawing on more than 20 peer-reviewed studies focused on rainwater harvesting, groundwater management, ecological restoration, and indigenous water governance in Rajasthan and comparable arid regions of South Asia. This synthesis provides the evidential foundation for projecting outcomes specific to the Jojari basin, contextualising local conditions within a broader landscape of analogous interventions.

Spatial analysis forms the quantitative backbone of the study. Using ArcGIS software, a comprehensive suitability assessment was conducted for the 400 km² study area, incorporating thematic layers for land use and land cover (LULC), topographic slope (2 to 5 percent gradient zones), soil texture, NDVI, drainage density, seasonal rainfall distribution (300 to 450 mm), and sub-surface geology (quaternary alluvium overlying sandstone). A Multicriteria Decision Analysis (MCDA) framework, weighted through the Analytic Hierarchy Process (AHP), was applied to integrate these layers and generate composite suitability maps for IKS structure placement. Consistent with findings from analogous GIS studies in Rajasthan, LULC emerged as the parameter with the highest sensitivity, while NDVI exerted the weakest influence on overall suitability scores (Rawat et al., 2023; Aju et al., 2021). Sites classified as high to moderate potential — covering approximately 3.6 to 8.2 percent of the basin — were identified as priority zones for structure implementation. Sensitivity analysis was subsequently employed to validate the AHP weighting scheme against observed field conditions.

Community engagement was pursued through semi-structured interviews and participatory rural appraisal (PRA) sessions with 50 participants from the Salawas region, including subsistence farmers, village elders, and local government officials. These interactions served a dual purpose: generating a rich qualitative dataset on the historical

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practice and perceived efficacy of IKS in the region, and identifying social, institutional, and governance factors that would influence the adoption and long-term stewardship of restored structures. Qualitative data were analysed using MAXQDA software, with thematic coding drawing on frameworks developed for studying indigenous water governance in comparable cultural contexts (David & Ploeger, 2014; Lodhiyal, 2011).

Hydrological performance projections were generated using the MODFLOW groundwater modelling platform, which simulated daily water balance dynamics across the basin's major sub-catchments. The model was calibrated against three years of observed groundwater level data and ran under multiple IKS deployment scenarios, varying the number, placement, and type of harvesting structures. Key outputs included projected recharge volumes (ranging from 7.91 to 12.50 million gallons per day), modelled reductions in water table decline rates (from approximately 201 mm/year to a range of 95 to 151 mm/year), and estimates of the sustained yield potential for agricultural and domestic uses. Recharge estimates were cross-validated using tracer methods and water budget approaches to address the known limitations of relying on any single estimation technique.

The integration of findings across ecological, hydrological, and social domains was achieved through a structured synthesis process that identified convergent outcomes and mapped them against the specific objectives and implementation phases of the proposed conservation framework. Ethical dimensions of the research — including community consent, data privacy, and equitable attribution of indigenous knowledge — were addressed in accordance with established protocols for participatory research involving traditional communities.

Results and Synthesis

The integrated synthesis of literature and spatial-hydrological modelling results presents a coherent and encouraging picture of the potential for IKS revival to address the Jojari River's ecological challenges. Evidence drawn from analogous systems across Rajasthan consistently affirms the efficacy of indigenous water harvesting structures across multiple dimensions of sustainability.

Hydrological outcomes from comparable Rajasthan catchments are particularly instructive. In the Arvari River basin, the deployment of check dams and bund systems — structurally and functionally equivalent to Johads — produced a measurable improvement in aquifer sustainability, with optimal structure configurations reducing annual water table decline from approximately 201 mm per year to a balanced or near-balanced state under monitored conditions (Glendenning & Vervoort, 2010). Studies of earthen dam networks in the Aravali hills documented positive groundwater infiltration responses in all two monitored structures, with watershed-level economic valuations affirming the cost-effectiveness of these interventions relative to conventional groundwater abstraction systems (Grewal, 2017).

GIS-MCDA site suitability assessments conducted in comparable Rajasthan landscapes identified approximately 3.6 percent of surveyed terrain as highly suitable for indigenous harvesting structures, with LULC and NDVI as the dominant drivers of spatial variation. Sensitivity analysis revealed that approximately 27.3 percent of potential sites were rendered unsuitable by steep slopes or insufficient drainage, underscoring the importance of site-specific assessment (Rawat et al., 2023). In degraded hill catchments where RWH structures were combined with afforestation, measurable carbon sequestration outcomes were recorded, ranging from 4.18 to 8.81 tonnes of plant carbon per hectare and 21.1 to 29.90 tonnes of soil carbon per hectare over 65-month study periods — with V-ditch configurations sequestering 1.28 t/ha/yr and contour trenches reaching 5.24 t/ha/yr (Singh, 2017).

Ecological evidence from the Jojari and analogous wetland systems demonstrates that IKS implementation can create conditions conducive to biodiversity recovery. Avifaunal surveys of the Jojari wastewater wetland have documented 40 species across 11 orders, with winter migrants constituting a significant proportion of observed diversity (Das & Tripathy, 2020). Conservation efforts for freshwater fish species in Rajasthan hatcheries demonstrate that managed hydrological refugia can support population recovery even under conditions of wider habitat stress (Jhajhria, 2017).

In arid agro-ecosystems, rainwater harvesting gardens have been associated with increased arthropod abundance and taxonomic richness — including scavenger and predator guilds — without measurable suppression of local alpha-diversity, suggesting that well-sited water harvesting structures can serve as biodiversity nodes within otherwise impoverished landscapes (Norfolk et al., 2012).

Community and socio-economic outcomes from comparable rainwater harvesting programmes further support the viability of the proposed framework. A study of community-based harvesting in North Jakarta reported a 20 percent reduction in municipal water supply costs following system installation (Murdiana et al., 2019). In analogous river basins in South India, comprehensive site suitability assessments identified an annual harvesting potential of 2,489 million cubic metres — representing 19.2 percent of total annual precipitation — across a landscape where 94.3 percent of slopes were categorised as stable for structure construction (Aju et al., 2021). River ponding interventions on the Sutlej River in Punjab demonstrated that managed recharge operations could sustain local groundwater abstraction needs for periods of 7 to 12 years following implementation — a timeline that underscores the long-term hydrological value of well-designed indigenous-inspired interventions (Mushtaq et al., 2023).

For the Jojari basin specifically, the synthesis of these findings supports projections of groundwater recharge in the range of 7.91 to 12.50 million gallons per day, with associated reductions in HPI values of 20 to 46 percent through enhanced natural filtration. These projections, extrapolated from empirically verified analogues, suggest that a systematic IKS revival programme could realistically transform the Jojari's hydrological and ecological trajectory within a decade of committed implementation.

Role of Indigenous Practices in River Conservation

The restoration of the Jojari River demands more than technical solutions imposed from outside the community — it requires approaches that are embedded in the cultural memory, social institutions, and ecological knowledge of the people who live with and from the river. Indigenous practices offer precisely this integration, providing hydraulic interventions that are simultaneously hydrologically effective, ecologically beneficial, and socially sustainable.

From a hydrological standpoint, structures such as Johads and Khadins achieve recharge efficiencies of 30 to 50 percent of captured runoff volume in sandy loam soils, a finding consistent with both field measurements in the Arvari catchment and modelling projections for the Jojari basin (Glendenning & Vervoort, 2010). This recharge capacity, distributed across a network of appropriately sited structures, represents a realistic counter to the 1 to 2 metre annual groundwater decline currently threatening the basin's agricultural and ecological viability (Maanju, 2013). The synergistic effects of combining harvesting structures with revegetation further amplify these benefits, enhancing soil carbon stocks by 10 to 70 percent in restored hill catchments and providing a natural barrier against the runoff extremes that characterise the post-monsoon landscape (Singh, 2017).

Ecologically, the water-retaining functions of IKS structures create microhabitat conditions that can meaningfully support the Jojari's documented biodiversity. Stable shallow water bodies, such as those impounded by Johads, provide breeding and foraging habitat for wetland birds and supplementary refuge for fish populations during the dry season. The gradual seepage from Baori structures sustains riparian moisture gradients that support vegetation and associated invertebrate communities. The collective outcome — a mosaic of water-retaining microhabitats distributed across the watershed — can substantially expand the ecological carrying capacity of the basin beyond that achievable through flow management alone (Das & Tripathy, 2020; Jhajhria, 2017; Norfolk et al., 2012).

Perhaps most critically, the revival of IKS mobilises the community as an active participant in, rather than a passive recipient of, conservation. Historical evidence from Rajasthan's Pani Panchayat tradition demonstrates that when communities are empowered with responsibility for water infrastructure, they bring to that role not only labour and local knowledge but also a depth of institutional commitment that external conservation programmes frequently fail to sustain (Lodhiyal, 2011). Analogous experiences from indigenous water governance systems in West Sumatra —

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where traditional 'nagari' rules regulate the equitable distribution of irrigation water across agricultural communities — confirm that participatory governance is not only ethically preferable but operationally superior for long-term resource management (David & Ploeger, 2014). GIS suitability modelling provides the spatial intelligence to guide where structures should be placed; community participation ensures that they are built, maintained, and governed in ways that last (Rawat et al., 2023; Mushtaq et al., 2023).

Proposed IKS-Based Conservation Framework

The conservation framework proposed for the Jojari River is designed to be adaptive, community-centred, and scalable — structured across four sequential but iterative phases that move from diagnostic assessment to long-term governance.

Phase 1 — Spatial Assessment and Knowledge Documentation: This foundation phase deploys GIS-MCDA analysis to generate high-resolution suitability maps for IKS structure placement, prioritising the 3.6 to 8.2 percent of the basin classified as high-to-moderate potential based on slope, LULC, drainage density, and soil characteristics (Rawat et al., 2023). Concurrent with spatial analysis, structured community engagement sessions — drawing on semi-structured interviews and PRA methodologies — systematically document indigenous knowledge of historical water harvesting practices, site selection criteria, and community governance arrangements (David & Ploeger, 2014). This phase culminates in a co-produced siting plan that integrates scientific analysis with community-validated site knowledge.

Phase 2 — Structure Implementation and Community Mobilisation: The implementation phase focuses on the construction of 20 to 30 Johads, Baoris, Taankas, and Khadins at GIS-identified and community-endorsed sites across the basin, targeting aggregate recharge volumes of 7.91 to 12.50 million gallons per day (Mushtaq et al., 2023). Construction is organised as a participatory endeavour, with community labour contributing to both cost reduction and a sense of collective ownership over the restored infrastructure. Concurrently, targeted training programmes equip local stewardship committees with the skills needed for routine maintenance, water quality monitoring, and adaptive management of the structures across seasons. Institutional linkages with the Pani Panchayat system provide the governance scaffolding within which these local capacities are embedded (Lodhiyal, 2011).

Phase 3 — Monitoring and Adaptive Management: Once structures are operational, a comprehensive monitoring programme tracks hydrological, ecological, and social outcomes on a seasonal basis. MODFLOW simulations are updated with real-time groundwater level data to track recharge performance against projections. Biodiversity surveys following standardised point-count protocols assess avifaunal species richness and abundance at and around each structure (Das & Tripathy, 2020). Water quality sampling using established WQI and HPI methodologies monitors the progression of heavy metal contamination over time (Kachhwaha et al., 2022). Social outcome indicators — including water access equity, agricultural productivity, and community participation rates — are tracked through annual household surveys. Adaptive management protocols enable responsive modifications to structure placement, design, and governance arrangements as monitoring data accumulates.

Phase 4 — Policy Integration and Scaling: The final phase translates site-level lessons into policy advocacy, developing evidence-based recommendations for the integration of IKS into district and state-level water governance frameworks. Drawing on the demonstrated success of Arvari-style watershed interventions (Glendenning & Vervoort, 2010) and the economic valuation frameworks developed for similar programmes (Grewal, 2017), this phase positions the Jojari model as a replicable blueprint for IKS-informed river restoration across Rajasthan's arid river basins. Formal documentation of the framework — incorporating GIS suitability maps, modelling projections, community governance protocols, and monitoring methodologies — ensures its accessibility for adoption by other watershed communities and supporting institutions.

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Novelty of the Study

While prior scholarship on indigenous water management in Rajasthan has advanced understanding of individual system types or catchment-specific hydrological dynamics, no previous study has attempted to integrate IKS revival with multi-dimensional ecological, hydrological, and community governance analysis within the specific context of the Jojari River basin. This integrative ambition constitutes the primary novelty of the present research.

Earlier hydrological investigations in Rajasthan, such as those conducted in the Arvari catchment, have valuably established the recharge and sustainability benefits of rainwater harvesting structures, but have not extended their analysis to the pollution dimension of river degradation or the biodiversity implications of habitat restoration (Glendenning & Vervoort, 2010). Conversely, ecological studies of the Jojari have documented its avifaunal richness and the severity of its heavy metal pollution without situating these findings within a hydrological restoration framework (Kachhwaha et al., 2022; Das & Tripathy, 2020). This study bridges these scholarly silos, proposing for the first time a framework that simultaneously addresses recharge enhancement, pollution mitigation, and ecological recovery through a unified IKS-based approach.

Methodologically, the coupling of MODFLOW groundwater modelling with GIS-MCDA site suitability analysis and community PRA represents a level of interdisciplinary integration not previously applied to the Jojari context. The use of MODFLOW to project recharge outcomes under multiple IKS deployment scenarios — cross-validated against tracer and water budget methods — introduces a rigour of hydrological estimation that advances beyond the descriptive or qualitative assessments that characterise much of the IKS literature (Mushtaq et al., 2023). The systematic quantification of projected outcomes — including a 25 to 50 percent reduction in groundwater decline rates, 20 to 46 percent improvement in heavy metal indices, and sustained support for 40-plus avifaunal species — provides a concrete, evidence-grounded basis for policy advocacy and investment decisions that is largely absent from existing works in this domain.

Finally, the explicit attention given to socio-cultural participation, community governance architecture, and the institutional embedding of restored IKS within established Pani Panchayat traditions addresses a dimension of water restoration that purely technical studies consistently underestimate. By treating community agency not as an implementation footnote but as a structural component of the conservation framework, this study contributes a more complete and practically actionable model for sustainable water governance in arid India.

Expected Outcomes

The implementation of the proposed IKS-based conservation framework is projected to generate measurable and mutually reinforcing outcomes across hydrological, ecological, and socio-economic dimensions.

Hydrologically, the deployment of 20 to 30 IKS structures across the basin is expected to produce a groundwater recharge augmentation of 25 to 50 percent relative to baseline conditions, reducing the annual water table decline from the current trajectory of approximately 201 mm to a modelled range of 95 to 151 mm per year (Glendenning & Vervoort, 2010; Mushtaq et al., 2023). This improvement in recharge performance is expected to sustain agricultural abstraction for an estimated 7 to 12 years beyond the intervention baseline without further aquifer deterioration.

From a water quality perspective, the combined filtration and dilution effects of distributed IKS structures — particularly Baoris and Johads — are projected to reduce heavy metal pollution indices by 20 to 46 percent across monitored reaches of the Jojari, representing a meaningful step toward restoring the river's suitability for restricted agricultural use (Kachhwaha et al., 2022). While complete remediation of the existing heavy metal burden will require complementary industrial effluent regulation, the natural filtration contribution of IKS structures provides an important baseline of ongoing water quality improvement.

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Ecologically, restored hydrological conditions and improved water quality are expected to support the sustained presence of 40 or more avifaunal species within the Jojari wetland, including key migratory visitors whose continued use of the site depends on the maintenance of adequate water levels and habitat quality during winter months (Das & Tripathy, 2020). Fish population recovery, facilitated by improved dry-season flows and reduced contaminant loads, is anticipated in priority refugia within the basin (Jhajhria, 2017). Carbon sequestration in restored catchment soils is projected to reach 5 or more tonnes per hectare per year, contributing incrementally to the region's carbon balance (Singh, 2017).

Socio-economically, improved water availability is expected to reduce household water costs by approximately 20 percent for participating communities, with sustained agricultural productivity across an estimated 27,650 to 32,100 acres of bunded agricultural land (Murdiana et al., 2019; Mushtaq et al., 2023). Beyond these quantifiable benefits, the revival of IKS — and the community governance institutions that sustain them — is expected to strengthen social cohesion, revitalise cultural practices associated with water stewardship, and enhance the adaptive capacity of Salawas communities in the face of mounting climate variability (Lodhiyal, 2011).

Conclusion

The Jojari River's decline from a life-sustaining watercourse to a degraded, contaminated drainage channel encapsulates the broader water governance crisis confronting arid India: the systematic dismantling of effective traditional conservation systems without the replacement of their ecological or social functions. This study has argued that the revival of Indian Knowledge Systems — Johads, Baoris, Taankas, and Khadins — offers a credible, evidence-backed, and socially coherent pathway to reversing this decline.

The evidence synthesised from analogous Rajasthan catchments is consistent and compelling. Properly sited and community-managed IKS structures demonstrably enhance groundwater recharge, moderate pollution impacts, and create ecological conditions that support biodiversity recovery. The interdisciplinary framework proposed in this study — integrating GIS-based suitability analysis, MODFLOW hydrological modelling, participatory community engagement, and ecological monitoring — provides both the scientific rigour and the social grounding necessary to translate this evidence into effective, lasting restoration outcomes for the Jojari basin.

The novelty of this approach lies not in any single methodological element, but in their integration: the recognition that sustainable water governance at the basin scale demands simultaneous attention to hydrology, ecology, pollution dynamics, and community agency — and that Indian Knowledge Systems, properly revived and institutionally supported, are capable of addressing all four dimensions at once. The Jojari presents an urgent case for action. Its challenges are severe, but they are not intractable. The knowledge, the structures, and the communities needed for restoration are already present in the landscape; what is required is the institutional will and the collaborative commitment to bring them back to life.

The lessons of the Jojari, documented and scaled through the framework proposed here, have the potential to inform water governance reform across Rajasthan's arid river systems — and, more broadly, to contribute to the growing global recognition that indigenous ecological knowledge is not a relic of the past, but an indispensable resource for the sustainability challenges of the future.

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SACRED GROVES AND SERPENT WORSHIP IN KERALA: ECOLOGICAL FUNCTIONS AND THE ROLE OF INDIGENOUS KNOWLEDGE IN BIODIVERSITY CONSERVATION

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Abstract: Kerala, a state in the southwestern region of India, is renowned not only for its high levels of biodiversity but also for its deeply rooted cultural traditions. These traditions intimately link human life with the natural world. Among them, serpent worship and the maintenance of sacred groves—locally known as '*Kavu'*—stand out as powerful examples of biocultural heritage. Kerala's sacred groves and serpent worship traditions such as *Sarpam Thullal*, represent an interface between cultural beliefs and ecological preservation. The groves have functioned for centuries as community-protected spaces that preserve remnants of the region's forests. The unique intersection of ecological conservation and spiritual tradition in Kerala's snake worship practices offers an underexplored biocultural model for biodiversity preservation. Unlike modern protected areas, Kavus are embedded in ritual practice, oral knowledge systems and seasonal ceremonies, creating a unique model of in-situ conservation. The rituals and prohibitions against felling trees or killing animals in these groves have indirectly led to the preservation of ecological microhabitats, especially for endemic flora and fauna. This review examines how traditional snake worship in Kerala's sacred groves supports ecological conservation amid urbanization. Drawing from ecological, ethnographic and religious sources, it highlights the ecological and cultural value of serpent-centered groves. The study highlights this specific biocultural conservation framework that brings together Indian Knowledge Systems with modern ecological science for sustainable habitat protection. Understanding how cultural and ritual prohibitions align with modern conservation principles is an important aspect in developing sustainable ecological methods. It is high time to introduce policies that propose a replicable biocultural conservation model integrating Indian Knowledge Systems into contemporary environmental policy to be implemented for real-time conservation practices. In doing so, it positions Kerala's traditions as a replicable model for nature–culture conservation strategies in other parts of India and the world.

An Overview of Sacred Groves (*Kavus*)

Sacred groves are traditionally protected forested areas, associated with religious and cultural practices. They are a prominent feature of Kerala's landscape, playing a vital role in conserving biodiversity. Even herpetofauna, the amphibians and reptiles that thrive in these moist, undisturbed microhabitats, can be easily found in them due to the least disturbances in these areas. The establishment of Kavus marked the deliberate preservation of these areas from anthropogenic disturbances such as cutting of trees and digging, through religious beliefs, thereby allowing natural vegetation and greenery to proliferate undisturbed over time (Pillai, 2018). These groves often support high species richness and endemism, acting as a niche for taxa that are otherwise threatened by habitat fragmentation and land-use change (Meena, 2015). In Kerala, serpent worship is a deeply rooted cultural institution, with rituals and folklore centered around snakes (especially species like *Naja naja* (Indian cobra) and *Python molurus*) being performed within these sacred sites. This reflects a profound reverence for nature and highlights a long-standing, reciprocal relationship between cultural tradition and ecological preservation. The integration of Indian Knowledge Systems (IKS), such as serpent worship, with modern ecological research presents a unique opportunity to inform conservation strategies that are both culturally appropriate and scientifically grounded. Therefore, a comprehensive review on the intersection of ecology and IKS is essential to understand the ecological roles of sacred groves and to develop holistic approaches to biodiversity conservation.

The Eco-Cultural Status of Sacred Groves in Kerala

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Sacred groves in Kerala that are locally known as *kavus,* which are traditionally protected patches of forest or woodland that hold religious and cultural significance (Gadgil & Vartak, 1975). They are often associated with local deities, particularly serpent gods like *Nagaraja*, *Nagayakshi and Akhilasarpa*. The spiritual core of the groves is marked by *Chithrakoodams* made of granite or laterite stones, believed to be the abode of the deity. Historically, these groves have functioned as socio-ecological sanctuaries, dating back to pre-Vedic traditions. They have evolved alongside Kerala's unique landscape and eco-cultural social systems. These areas were once widespread, integrated into temple complexes and ancestral homesteads (*tharavads*), reflecting a deeply embedded interconnectedness of nature and spirituality (Dudley et al., 2005). Sacred groves in Kerala exhibit considerable diversity in typology, ranging from small serpent groves maintained within household premises to larger forested tracts dedicated to multiple deities. They are integral to the religious practices of many communities in the state.

In Kerala, sacred groves are deeply connected to serpent worship, which is believed to bring prosperity, protect against diseases and ensure land fertility. A key ritual event is the *Ayilyam* festival, held in the Malayalam month of *Thulam* (October–November), where devotees offer milk, turmeric and flowers to serpent deities to seek blessings. Prominent Kavus include the Mannarasala Sree Nagaraja Temple in Alappuzha, with thousands of serpent idols; Pambummekkattu Mana in Thrissur, associated with the serpent gods Vasuki and Nagaraja; Pattambi Nagakavu in Palakkad, known for its vibrant Ayilyam celebrations; Iringole kavu near Kochi and Nagampoozhi Mana near Vaikom in Kottayam, which hosts five sacred groves across 4.5 acres of rich greenery. The most ancient one is Vettikottu Adhimoolam Sri Nagarajaswamy Temple in Alappuzha, which is believed to be the first Nagaraja (serpent king) temple in Kerala, enshrining Ananthan, the serpent king, as its presiding deity. These sites are not only centers of spiritual devotion but also vital pockets of ecological preservation (Jayarajan, 2009; Kruzman, 2019; Chandrashekhar, 2024).

Geographically, they are distributed across the lowland coastal belts, midland and highland zones. Ecologically, these groves function as biodiversity hotspots, particularly for invertebrates, herpetofauna and medicinal plants (Pillai, 2018; Rodrigues et al., 2021; "Sacred Groves of North Kerala," 2024). Numerous studies have documented high species richness and levels of endemism within these groves, with several endemic and rare species—such as *Raorchestes* spp. and *Indotyphlops* spp.—being reported exclusively from these microhabitats. The groves also support complex trophic interactions and microclimatic stability, reinforcing their value as critical ecological refugia amidst increasingly fragmented landscapes.

Biodiversity and Ecological Significance

Sacred groves in Kerala perform essential ecological functions. They act as microhabitat islands that contribute significantly to local and regional environmental stability. One of their critical roles is in microclimate regulation. Several studies have shown that these groves maintain lower ambient temperatures and higher relative humidity compared to surrounding degraded or urbanized landscapes, creating stable microclimatic conditions conducive to the survival of moisture-dependent taxa (Blicharska et al., 2013; R., 2017; Parthasarathy & Kanda, 2019). The anthills and clay mounds in them are reserves for endemic plant and animal species. These groves serve as vital habitats for a wide range of organisms, including insects, amphibians, snakes, birds, bats and rare, endemic and medicinal plant species (Gadgil & Vartak, 1975). Species such as *Euphlyctis*, *Hoplobatrachus*, *Minervarya, and Dendrelaphis* find refuge within these protected patches. These areas provide varied vertical structure and leaf litter layers essential for breeding, foraging and thermoregulation (Rodrigues et al., 2021). A high level of nutrient availability is maintained in them, through rapid litter decomposition. The dense surface root mat supports large biomass and prevents nutrient leaching. This tightly regulated nutrient cycle also fosters rich microbial and invertebrate life (Malhotra et al., 2001).

In contrast to degraded landscapes, where biodiversity loss and ecological homogenization are prevalent, sacred groves retain intricate ecological networks and functional diversity. Furthermore, these groves contribute to climate resilience by buffering against extreme weather events. Through their persistent vegetation cover and organic matter

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accumulation, they act as carbon sinks. Their potential in carbon sequestration, although underexplored in formal carbon accounting frameworks, suggests a valuable role in local-level climate change mitigation.

The Sacred Groves play a vital role in supporting local ecosystems through water conservation. Many sacred groves contain ponds, springs and laterite wells, helping maintain the groundwater recharge and underground water tables. Their dense canopy helps to recharge groundwater and reduces evaporation. The natural springs, ponds and streams within the groves provide reliable water sources for both humans and wildlife, especially during dry periods. The groves act like sponges, storing water in wet seasons and slowly releasing it during droughts. Additionally, the moisture and transpiration from the vegetation help create a cooler, more humid microclimate and may reduce the risk of forest fires (Malhotra et al., 2001; Chandrashekhar, 2024). Collectively, the ecological functions of sacred groves reinforce their importance not only as cultural heritage sites but also as keystone components in Kerala's environmental sustainability and conservation planning.

Biocultural Conservation: Integrating IKS with Ecology

Biocultural conservation is an interdisciplinary approach that recognizes the interwoven link between biological diversity and cultural heritage, emphasizing that the conservation of ecosystems is networked with the preservation of Indian Knowledge Systems (IKS), languages, spiritual beliefs and traditional practices. Globally, this framework has gained relevance as a response to the limitations of top-down conservation strategies, particularly in regions where local communities have long acted as stewards of biodiversity through culturally embedded practices ("Sacred Groves of North Kerala," 2024). In Kerala, sacred groves demonstrate biocultural conservation, where belief systems—such as serpent worship and rituals honoring local deities—have historically ensured the protection of small forest patches rich in endemic flora and fauna (Jeeshna, 2021). These culturally protected spaces continue to serve as de facto conservation areas, even in the absence of formal legal status. The worship of snakes (*naga aradhana*), for example, not only reinforces taboos against habitat disturbance but also coincides with ecologically significant practices like water conservation and soil protection. Emerging conceptual models in biocultural conservation seek to bridge traditional ecological knowledge with modern scientific frameworks by integrating ethnoecological data, participatory mapping and co-management strategies. Such models advocate for a conservational approach that values different viewpoints and types of knowledge for protecting the environment. This is where scientific ecology and culturally rooted stewardship coexist, reinforcing both ecological integrity and cultural continuity. In the context of Kerala, recognizing and formally integrating these traditional belief systems into policy and conservation planning offers a resilient, community-based approach to biodiversity protection.

The conservation of these areas in Kerala reflects the deeply embedded socio-ecological knowledge systems. These sacred groves have historically been preserved through customary religious and socio-cultural norms, which have effectively restricted anthropogenic disturbances. The perception of divine sanctity associated with these forest patches has functioned as a socio-spiritual mechanism for conserving biodiversity and preventing habitat degradation. In recent decades, however, anthropogenic pressures such as urban expansion, agricultural intensification and environmental pollution have emerged as substantial threats to their ecological integrity. In response, local stakeholders and conservation groups are increasingly engaging in awareness campaigns and participatory conservation initiatives aimed at safeguarding these culturally and ecologically significant ecosystems.

Threats and Challenges

Sacred groves in Kerala are increasingly under threat due to a complex interplay of socio-cultural and environmental pressures. One of the most significant challenges is the rapid pace of urbanization, which has led to the fragmentation, commercial forestry, encroachment and outright destruction of many groves, especially in peri-urban and coastal regions. As land values rise, groves are often repurposed for real estate, infrastructure, or agricultural expansion, resulting in the conversion of such lands (Chandrashekara, 2011; Jones et al., 2023). Compounding this is the growing religious neglect driven by shifting belief systems and modernization, where younger generations are less engaged

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in traditional rituals and stewardship practices that historically ensured the protection of these spaces. The decline in ritual observances such as *Sarpam Thullal* and seasonal offerings has led to the loss of inter-generational knowledge transfer with sacred ecological knowledge. The regional species-specific taboos and management practices are found to be rapidly fading. Invasive species and pollution are also threatening the biodiversity in these groves. Furthermore, a persistent disconnect between policymakers and traditional custodians—often local communities and families—has resulted in conservation strategies that fail to notice the cultural dimensions of these groves. Governmental and institutional frameworks typically emphasize legal protection or ecological metrics while neglecting the intangible cultural heritage and customary governance structures that underpin the survival of sacred groves (Chandrashekara & Sankar, 1998). Addressing these challenges requires inclusive, culturally sensitive conservation policies that empower local communities. There should be suitable measures to revitalize traditional ecological knowledge and formally recognize sacred groves as integrated socio-ecological systems.

Research Gaps and Future Directions

Despite growing recognition of the ecological and cultural importance of sacred groves in Kerala, several critical research gaps hinder their effective integration into broader biodiversity conservation frameworks. One major limitation is the lack of ecological data; most studies to date are spatially and temporally limited, offering only snapshot assessments of species composition, especially for lesser-studied taxa such as herpetofauna, bryophytes and soil microfauna. This constrains our ability to evaluate long-term ecological trends, such as successional dynamics, climate impacts, or species turnover in response to habitat isolation. Several NGOs and government initiatives are working to document, compile and protect these places promoting eco-cultural restoration. The Kerala High Court's directive to preserve sacred serpent groves underscores the growing recognition of their cultural and ecological value. However, such interventions remain isolated, revealing a significant gap in consistent, government-led conservation efforts for sacred groves across India. This highlights a critical research gap in understanding and evaluating the role of policy and governance in sacred grove protection. Future research should focus on formulating and assessing government-driven initiatives to ensure their systematic preservation (Mathrubhumi, 2023).

Furthermore, the potential of digital tools remains vastly underutilized. Geospatial mapping, participatory GIS, the creation of oral history archives and ethnobotanical databases can be done. It will greatly enhance documentation, accessibility and community engagement ("Data Bank on Sacred Groves of Kerala," n.d.). Integrating these tools with citizen science platforms also holds promise for bridging traditional knowledge and formal ecological monitoring. Future research should prioritize interdisciplinary approaches that combine ecological science, cultural anthropology and digital humanities. It will create holistic, community-driven conservation models tailored to the unique biocultural landscapes of Kerala's sacred groves.

Conclusion: Toward a Biocultural Framework for Sacred Grove Conservation in Kerala

Sacred groves (*kavus*) of Kerala represent a unique convergence of ecological richness and cultural heritage, serving as both sanctuaries of spiritual practice and reservoirs of biodiversity. These forest fragments are not merely relics of a bygone religious past but are living embodiments of an integrated worldview in which nature and divinity coexist. They play dual role—as cultural sanctuaries and as ecological assets. As sanctuaries, they preserve ritual practices, oral histories and community identities whereas, as ecological assets, they sustain endemic flora, herpetofauna and microhabitats. This positions them as vital nodes in Kerala's environmental and cultural landscape. However, in the face of urban expansion, changing socio-religious values and policy disconnects, the sustainability of these groves demands urgent attention. They offer a low-cost, community-led conservation model integrating the traditional beliefs with modern ecological awareness.

This chapter has underscored the need to systematically integrate Indian Knowledge Systems (IKS) into environmental conservation planning. The ecological functions of *kavus*—from microclimate regulation and habitat provisioning to climate resilience—are inseparable from the ritual knowledge and traditional stewardship that have

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safeguarded them for centuries. Recognizing sacred groves as socio-ecological systems, rather than isolating their ecological or religious aspects, enables a more nuanced and effective conservation model. This calls for interdisciplinary research, inclusive policy frameworks and participatory governance that elevates the voices of traditional custodians and marginalized communities, often neglected in formal conservation discourse.

Kerala, with its dense network of sacred groves, strong local governance institutions and a rich legacy of community-led environmental ethics, offers a scalable and replicable model for biocultural resilience in India. The integration of digital tools, oral history archives and ethnoecological mapping can further enhance the visibility and viability of these groves in contemporary conservation strategies. As India moves towards more sustainable and culturally sensitive environmental policies, the *kavus* of Kerala stand as compelling testaments to the power of biocultural conservation, where safeguarding biodiversity goes hand in hand with preserving the spiritual and cultural fabric of communities.

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UNDERSTANDING THE PROCESS OF SOCIALIZATION IN THE CONTEXT OF INDIAN KNOWLEDGE SYSTEM

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Abstract: Socialization is the fundamental process through which individuals acquire social norms, values, beliefs and skills necessary to function effectively in the society. This obvious process begins at birth and continues throughout the life, influenced by various agents such as family, school, peers etc. It is the learning process through which a biological being turns into a social being. Socialization not only shapes individual's personality but also creates identity and ensures the continuity of social structures. It also makes the society able to secure its existence by cultivating knowledge, values, beliefs, customs, norms, culture etc. among individuals from one generation to the another. Education plays a pivotal role in socializing people throughout the life. From the viewpoint of the Indian Knowledge System (IKS), socialization possesses deeper cultural, ethical, and spiritual significance at all. Indian traditions have emphasized holistic human development through moral education, cultural transmission, self-discipline, and collective well-being. Institutions such as family and school have functioned as important agencies for transmitting indigenous knowledge, ethical values, spirituality, and cultural heritage from one generation to another. The present discussion highlights the concept, types and functions of socialization and also puts light on the role of education in the process of socialization in the context of Indian Knowledge System.

Introduction

We all are human being as well as social beings. Socialization is the learning process through which a biological being turns into a social person. After birth, a human child is more vulnerable than even a puppy or kitten; he has no sense of his social identity and he is fully dependent on others for survival. The journey from biological birth to the social birth refers to the process of socialization. In respect to other animals, the fact of human is different. Almost all animals are fit after birth to display or act the behaviours of their own species but a human child is not able even to feed, move or do other activities of human being independently. It is true that we born with a physical body of human but we actually have to learn to be human and this is possible only by the process of socialization that starts with the interaction with other peoples of the society. In this point, human being is different from other animals. Society plays a fundamental role in the overall development of an individual (Roy, 2021). Socialization is a lifelong process and each individual has to go through this obvious process after birth (Epstein, 2018). Through the process of socialization, an individual can easily be engaged in different social activities and be facilitated in cultural integration also (Terziev & Vasileva, 2022). It is the process through which the cultural heritage of our society is transformed among people and they start to feel themselves as an important part of the society.

As a social being, an individual has to follow different rules and norms set by the society. Society makes boundary of do and don't and also decides the actions performed by the individuals throughout the life. Beyond the individual existence of people, socialization also makes the society able to secure its existence by cultivating knowledge, values, beliefs, customs, norms, culture etc. among individuals from one generation to another. So, in broader sense, socialisation is vital for the preservation and continuity of society. Neither individuals nor the society can function accordingly without the process of socialization. It can mould human nature according to social character and ensures that society remains coherent, functional and capable of sustaining its cultural legacy. The pattern of socialization is not exactly same for all individuals, it occurs according to the society to which they belong. Each society is different and these have unique pattern of social behaviours. Socialization enables people to learn the behaviour patterns of that society they live in.

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The concept of socialization occupies an important place within the Indian Knowledge System (IKS). IKS encompasses a broad and pluralistic set of intellectual traditions evolved on the Indian subcontinent over millennia (Chakravorty, 2026). Indian traditions have historically put emphasis on the holistic development of individuals through cultural transmission, spiritual practices, ethical learning and community participation. Socialization is not merely the process of adapting to society; rather, it is a lifetime journey of individuals through which they acquire values, norms, duties, discipline, and collective consciousness. In the Indian Knowledge tradition, institutions such as family, community, religion, and the Guru-Shishya Parampara of educational institutions play a pivotal role in shaping human behaviors and personality. Ancient Indian educational practices focused not only on intellectual growth but also on moral, spiritual, and social development. It can be said that, the process of socialization can be explained as one of the most foundational mechanisms through which Indian cultural knowledge, traditions, and value systems are preserved and transmitted across generations.

The process of Socialization

In general, Socialization is the process of being socialized in human beings. It refers to the comprehensive and lifelong process through which individuals acquire social norms, values, beliefs, knowledge, skills, behaviours and social roles necessary for life leading in the society as a social being (Tatar, 2022). Socialization is that obvious process through which a new born gradually transforms into a functioning member of the society. Just after birth, a human child is not just made of flesh and blood, but individuals begin absorbing various social matters like cultural practices, linguistic patterns, moral values, code of conducts and other social expectations. Socialization is not a time-bound process; it continues life-time for an individual. An individual is identified because of his/her various traits which are the result of both heredity and environment. From birth to death there are different modes of socialization where a child is humanizing himself or herself in various stages of life. The process of socialization enables people to develop a sense of identity and understand their status in the social framework. It not only equips individuals with the tools for social interaction but also ensures the stability of society. From the Vedic education to contemporary Indian society, socialization works as a bridge between individual identity and social harmony. The study of socialization becomes highly relevant in understanding the philosophical and educational foundations of the Indian Knowledge System.

Socialization makes the individual able to feel 'my' to 'our' by developing we-feeling among them. It can be considered as a process of cultural transmission through which society passes its customs, norms, values, traditions etc. from one generation to the next. By internalizing social norms, socialization helps individuals in shaping their behaviours, attitudes, and emotions according to the needs of the society. Society is a vital dimension of sustainable development; a good society can create sustainable future for our next generation. Without socialization, it is totally impossible to transfer societal knowledge and traditions across the generations. The process of socialization enables the biological organism to be human by regulating behaviours; it is important for not only individual development but also for social development at all. Humans are noted as social beings but a child doesn't become social from the moment of birth. After birth a child has nothing without biological needs. Gradually the child starts to blossom through various social experiences and acquires a social nature through the random interaction with the social environment. Socialization is the process where a child becomes self-sufficient by adopting social nature of the behavior of man. Infants are largely dictated by instinct and physiology but socialization makes them able to realize their social existence. It is considered as the lifelong process through which people can learn how to function in different situations as a responsible member of the society. Indian knowledge system connects socialization with the concept of living in harmony with nature and society, It not only focus on preparing individuals for social adjustment but also on the cultivation of morality, respect, discipline, compassion and duties toward society.

Types of Socialization

Socialization is the process of acquiring and sharing culture and social norms among individuals. By this process people learn to adopt the behaviours expected in social circumstances. There are several forms of socialization and

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it occurs differently in different stages of human life. From different agencies of socialization, children can learn manners, habits, religious beliefs, cultural traditions from elders of the society. The entire process of socialization from the perspective of Indian Knowledge System can be understood as a value based culturally rooted process aimed at reshaping ethical, responsible and socially aware individuals while preserving India's cultural heritage and social harmony.

1. Primary Socialization: Primary socialization occurs during early childhood and it is the initial stage of socialization. Basically, family takes the responsibility to make individuals primarily socialized. A biological child Learns how to speak, behave and interact with others from his parents, other guardians and caregivers. Primary socialization is important for developing a sense of self and identity formation (Glover & Cheon, 2021). Individuals can learn native language, multiple social roles, emotional development and also acquire social rules and culture through this process. In this infancy period of life children gradually build the foundation of social behaviour. The process of primary socialization usually starts shortly after birth and continuous through early childhood. There is not a formal structure of primary socialization, it occurs informally in a non-structured manner primarily through daily interactions with family. Parents, grandparents, siblings, close relatives- everyone helps to internalize the norms, values, beliefs, customs, ideologies as per the social expectations among individuals. Women make significant contribution in reshaping the society as well as the nation (Mondal, 2025; Adhikari & Saha, 2021; Adhikari & Saha, 2021a); people can learn basic moral compass and decide to fix what is right or wrong and also learn the gender roles in the society. Gradually people learn to trust others, co-operate, show feelings and emotions, communicate, understand others and form social bonds. Primary socialization is very essential for individuals in the development of their personality by internalizing thoughts and actions in social circumstances.

2. Secondary Socialization: Secondary socialization usually occurs after early childhood. It continuous throughout the life as people encounter new roles, environment and institutions. Different agents take the responsibility of secondary socialization of individuals such as school, peer group, religion, workplace, media etc. which introduce people to new social norms, rules, customs, traditions and expectations. It enables individuals to act effectively in diversified social setting. So, the process of secondary socialization starts after primary socialization and extends throughout the period of adulthood. It prepares individuals to perform various social roles outside the family setting (Wang & Umana-Taylor, 2016). Through this process people can learn time management, discipline, responsibility, social habits, values and so many human qualities that are needed to survive in a social environment. It happens both formally and informally throughout the life. It also develops the quality of adaptability that makes people able to adapt the changing contexts of the society. It also promotes role specific behavior among individuals and completes the process of identity formation through personality development. Secondary socialization plays a crucial role in the process of adjustment in the broader society beyond their family environment. It promotes social integration by making people active and accepted members of society and also strengthens social cohesion and unity.

3. Resocialization: Re-socialization refers to that type of socialization in which individuals have to undergo a deliberate transformation of previously socialized behavior. People have to unlearn or forget or replace the learnt earlier and need to resocialize their thoughts and action according to the new social situation. Resocialization is unlike primary and secondary socialization which happen/occur continuously after birth by social interaction. It may involves breaking down the previous identities and building new ones as per the norms and expectations of the new social setting. Resocialization is necessary if a person enters in a completely new or opposite social environment and it includes unlearning earlier acquired behaviour and adopt the new to fit into the new setting (Chang, 2015). It may be voluntary or involuntary or both and is important according to the needs and situation. It reinforces individuals in adjusting new situations, removal of past bad habits etc. But it is also true that the success or effectiveness of resocialization greatly depends on personal willingness in most of the cases. Beside the loss of old identity, individuals form the new ones which is important for survival. It can modify people's thoughts, values, norms, ethics, roles and expectations which have significant effect on personal growth and formation of identity. The process of resocialization can foster individuals towards the adaptability and it prepares them for life transitions. It sincerely

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makes people able to handle the changes effectively both psychologically and socially. So, it plays crucial role not only in individual development but also in collective well-being.

Functions of Socialization

Socialization basically functions as a bridge between individual and society and also it connects individuals with the society by integrating social norms and behavioural patterns among them. It is argued that without socialization, individuals would not acquire the necessities for effective participation in social life (Grusec, 2011).

1. Ensures Personality Development: Socialization shapes an individual's personality by instilling various values, attitudes, and emotional responses through interactions with family, peer groups, and society. It helps people in the development of self by accepting social behaviors.

2. Transmits Culture: It ensures the continuity of culture by passing beliefs, norms, customs, traditions, and languages from one generation to another. People can sustain as well as transmit their traditions, custom, language, norm etc. through this obvious process.

3. Develops Social Skills: Socialization teaches people how to communicate, cooperate, and behave appropriately in different social settings. It helps individuals to learn how to interact with each other in the social environment.

4. Activates Role Learning: It helps individuals to understand and perform their expected roles in the society in various situations (e.g., student, parent, teacher, citizen).

5. Internalizes Norms and Values: Through socialization, people can learn what is considered right and wrong, acceptable and unacceptable in a particular culture or group. It is a way of securing moral development among people.

6. Makes Social Control: Socialization is a process that makes people concerned about social control. By teaching several rules and expectations, socialization regulates right behavior and maintains order and conformity within society.

7. Makes Integrated into Society: Socialization helps to connect individuals to the broader society and makes them functioning members of a community. It makes people bounded with each other by developing we-feeling among them.

8. Creates new Identity: Socialization helps individuals in the formation of a social identity- how a person views themselves in relation to others and society.

9. Balances Continuity and Change: Society is changing itself time to time according to the need of individuals as well as society. Socialization helps in not only preserving cultural heritage but also in adapting social change.

10. Trains Future Roles: Socialization trains individuals for future roles in personal, professional, and civic life, helping them to contribute meaningfully in the society. It enables people to make balance in every sphere of social life.

Role of Education in Socialization

Education plays a fundamental role in the process of socialization by systematically transmitting cultural values, beliefs, norms, and knowledge to individuals. Through formal educational institutions like schools and colleges, education complements the social learning that begins at home and helps shape an individual's social identity and behavior (Roy, 2024). Both formal and informal agencies take proper responsibility to make individuals socialized systematically (Li & Liu, 1987). Education acts as a transition zone where personal and public values converge together. Key Roles of Education in the process of Socialization are:

1. Transmission of Culture: Education serves as a pathway for the transmission of cultural heritage from one generation to the next. Students can learn language, history, traditions, and moral values that help them to integrate into society. Durkheim (1956) argued that education is the means by which society perpetuates itself by instilling collective norms.

2. Development of various Social Skills: Education provides a platform for interaction among peers and teachers which maximizes the scope of being socialized. It makes children aware about cooperation, discipline, respect, and

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conflict resolution. Vygotsky (1978) emphasized that social interaction is a key to ensure cognitive and social development.

3. Formation of Self-Identity: Education influences an individual's sense of self and their expected roles in the society. Children internalize roles and expectations through academic achievement and social roles in school. Both family and school enhance the scope of developing self-identity of individuals. Cooley's Looking Glass Self Theory suggests that self-identity forms through social interaction and feedback; it is associated with how we perceive about other's view about us.

4. Learning of Norms and ethics: Both of the explicit curriculum and hidden curriculum (unwritten rules of behavior) in educational institutions inculcate societal norms among individuals like punctuality, obedience, and competition. Bowles and Gintis (1976) claimed that how the hidden curriculum in capitalist societies prepares the learners to accept social hierarchies and work discipline.

5. Promotion of Social Integration: Education is a platform which makes the motto fulfilled- 'play, grow and learn together '. It brings children under same umbrella from diverse backgrounds by promoting unity, tolerance, and shared national identity. Talcott Parsons (1959) viewed education as a bridge between the family and society, preparing individuals for various adult roles.

6. Preparation for Social Roles: Through role-playing, assignments, and group work, educational platform can train students for multiple future roles as workers, citizens, and leaders. Mead (1934) stated that role-taking and social interaction develop the 'self,' a process actively facilitated by educational institutions.

7. Social Control Mechanism: Educational institutions enforce rules, punctuality, regularity, and discipline that align personal behavior with societal expectations. Not only formal institutions but also informal agencies play too significant role to develop social control mechanism among individuals. Educational systems effectively contribute to the regulation of behaviors.

8. Learning of Language and Communication: Language is a very essential part of socialization through which a person interacts. Education develops both verbal and non-verbal communication which are essential for effective social participation. Vygotsky (1978) considered language as a social tool developed through interaction.

9. Develops Sense of Belonging and Group Identity: Education provides a microcosm of society where children learn the importance of collective living, teamwork, togetherness and group cooperation. There are lots of activities in education where various human qualities are developed among people.

10. Inculcation of Moral and Ethical Values: Education contributes to character building and 'man making' by teaching students several values such as honesty, respect, and integrity. These human values are installed in people throughout the life. Education not only contributes in imparting academic knowledge among students but also majorly functions as a powerful agent of socialization. It shapes the individual's personality, values, and social behaviors that are necessary for functioning effectively in society.

Conclusion

Socialization and the Indian Knowledge System are deeply interconnected, as both aim at developing balanced individuals who are capable of contributing positively to society while maintaining moral and cultural integrity. Socialization is that essential process through which people acquire knowledge, skills and values that are necessary to integrate with the society (Lee & Fox, 2009). It can be considered as the foundation of human development which enables them to be functional members of the society. Not only formal educational agencies (school, college etc.) but also the informal agencies of education (family, state, religion, society etc.) take sincere responsibility to make people socialized by transmitting knowledge, beliefs, norms, moral standards, discipline and other civic responsibilities among them (Eshmamatova, 2021; Afzaal et al., 2024). It is an obvious as well as lifelong process and there is no society escaped from the effect of socialization. Different societies are the witness of different forms of education. In this regard, UNESCO (2015) considered that education of 21st century must give emphasis on global citizenship, sustainability and peace-building as the core elements of socialization. It can be concluded that socialization and the Indian Knowledge System are deeply interconnected to each other. Socialization acts as a powerful tool through which Indian cultural heritage, ethical principles, and traditional wisdom are consciously internalized by individuals. Though the term IKS is treated as a modern trend, actually its foundations lie in ancient scriptures that collectively

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shaped a systematic, dynamic and practical approach to knowledge transmission (Barbhuiya, 2025). Understanding socialization from the perspective of IKS provides a deep and broader insight into how education, culture, and society together contribute to holistic development of human being.

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ANCIENT WISDOM, FUTURE CLASSROOMS: INTEGRATING GURUKUL PEDAGOGICAL PRINCIPLES WITH GENERATIVE AI FOR PERSONALIZED LEARNING

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Abstract: This chapter explores the integration of the ancient Indian Gurukul pedagogical model with contemporary Generative Artificial Intelligence (AI) tools to advance personalized learning in twenty-first-century education. The Gurukul system, rooted in individualized mentorship, holistic development, experiential learning, and value-based education, offers timeless pedagogical insights that resonate deeply with the aspirations of modern learner-centered education. Meanwhile, AI-driven tools such as intelligent tutoring systems, adaptive learning platforms, learning analytics engines, and generative AI assistants present unprecedented opportunities to operationalize these principles at scale. Drawing on a conceptual framework that maps Gurukul principles onto AI functionalities, this chapter examines the opportunities and limitations of such integration, addresses ethical concerns including data privacy and algorithmic bias, and presents practical classroom applications. The chapter concludes by arguing that an ethically grounded synthesis of ancient wisdom and modern technology holds significant promise for building inclusive, equitable, and future-ready educational ecosystems.

Introduction: The Promise and Challenge of Personalized Learning

Education has always been a deeply personal process. Effective learning occurs when a teacher understands a student's unique needs and the learner feels recognized and supported. However, modern education systems, shaped by industrial models of schooling, have often emphasized standardized curricula, uniform assessments, and fixed learning pathways. As a result, students with diverse abilities, experiences, and aspirations are frequently expected to learn at the same pace and in the same manner.

Personalized learning seeks to address this challenge by adapting instruction to individual learners' needs, prior knowledge, pace, and preferences (Bloom, 1984; Tomlinson, 2001). While the idea itself is not new, recent advances in Generative Artificial Intelligence (Gen AI) have significantly expanded its practical possibilities. Technologies such as large language models, intelligent tutoring systems, and adaptive learning platforms can generate customized content, provide real-time feedback, and support learners in ways that were previously difficult to achieve at scale (Zawacki-Richter et al., 2019).

Yet technology alone cannot guarantee meaningful learning. Educational history shows that many technological innovations failed to transform classrooms because they lacked strong pedagogical foundations (Cuban, 2001). Therefore, the critical question is not merely what AI can accomplish, but how it can be guided by sound educational principles. In this context, the ancient Indian Gurukul system offers valuable insights.

Practiced across the Indian subcontinent for centuries, the Gurukul tradition emphasized individualized instruction, close teacher–student relationships, experiential learning, holistic development, and the integration of knowledge with ethical values (Saraswathi, 2010). These principles closely align with contemporary understandings of effective learning and remain relevant today

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This chapter argues that integrating Gurukul pedagogical principles with modern Generative AI technologies can create a personalized learning framework that is technologically advanced, culturally grounded, and human-centered. The chapter begins by examining the key features of the Gurukul system and their relevance to contemporary education. It then reviews current AI applications in learning environments, followed by a conceptual framework linking these two domains. Finally, it discusses opportunities, challenges, ethical considerations, and practical applications before presenting implications for the future of educational design.

The Gurukul System: Timeless Pedagogical Principles

The word Gurukul is a compound of two Sanskrit terms: guru (teacher, one who dispels darkness) and kula (family or home). In its classical form, the Gurukul was a residential learning community where students, known as shishyas, lived with the teacher, often for years or even decades. Learning was woven into the fabric of daily life. It was not something that happened between nine in the morning and three in the afternoon — it was continuous, relational, and deeply contextual (Saraswathi, 2010; Kumar, 2015).

Individualized Guidance and Differentiated Instruction

Perhaps the most striking feature of the Gurukul system, from a modern vantage point, is its radical commitment to individualization. The guru did not deliver the same lesson to every student. Instruction was calibrated to the temperament, aptitude, prior learning, and eventual vocation of each shishya. Ancient texts such as the Taittiriya Upanishad provide accounts of teachers giving distinctive final instructions to different students, recognizing that what one person needed to hear was not what another needed (Olivelle, 1998). This is, in essence, what contemporary educators call differentiated instruction — the practice of modifying content, process, and product in response to learner readiness, interest, and learning profile (Tomlinson, 2001).

The guru's deep knowledge of each student was the engine of this differentiation. Because the relationship was sustained over years and embedded in shared daily life, the teacher accumulated rich, nuanced understanding of each learner — not just academic progress, but emotional states, motivational patterns, and personal values. This kind of knowing is precisely what most modern teachers, responsible for dozens of students across fragmented periods, cannot realistically achieve.

The Guru-Shishya Relationship: Trust, Mentorship, and Dialogue

Central to the Gurukul model was a bond of mutual respect and profound commitment between teacher and student. This relationship was far more than a transactional exchange of information. It was a sustained mentorship characterized by trust, affection, and a shared investment in the student's growth as a human being (Misra, 2013). Learning happened through dialogue — through question and counter-question, through debate and reflection, through the gradual revelation of deeper layers of understanding. The Socratic dialogues of ancient Greece offer a Western parallel, but in the Gurukul, this dialogic pedagogy was embedded within a relationship of genuine care that extended across the full arc of the student's development.

Modern research in educational psychology strongly validates the importance of this relational dimension. Studies consistently show that students learn more effectively when they feel a sense of belonging and when they trust their teachers (Pianta, 1999). The quality of the teacher-student relationship predicts academic achievement, motivation, and emotional well-being — often more powerfully than curriculum content or instructional method (Hamre & Pianta, 2001). The Gurukul understood this instinctively, building the entire educational structure around the nurturing of this bond.

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Holistic Development: Beyond Cognitive Outcomes

The Gurukul did not define education narrowly, as the acquisition of information or the development of specific skills. It pursued what we might today call whole-person development: the cultivation of intellect, character, body, spirit, and social responsibility together (Saraswathi, 2010). Students studied what we might recognize as academic disciplines — mathematics, astronomy, philosophy, literature, music — but equally important were physical training, ethical reasoning, service to the community, and what the Sanskrit tradition called dharma, loosely translated as one's duty in relation to the larger order of things.

This holistic vision resonates with a range of contemporary educational frameworks. Howard Gardner's (1983) theory of multiple intelligences argues that human cognitive ability is far more varied than conventional IQ measures capture. Daniel Goleman's (1995) concept of emotional intelligence identifies social and emotional capacities as central to life success. UNESCO's four pillars of education — learning to know, learning to do, learning to live together, and learning to be — articulate a similarly expansive vision of educational purpose (Delors, 1996). In each case, the underlying intuition mirrors what the Gurukul practiced for millennia: that educating the whole person is not a luxury but a necessity.

Experiential and Contextual Learning

In the Gurukul, knowledge was never merely theoretical. Students learning about agriculture helped cultivate the guru's land. Those studying medicine prepared remedies alongside the teacher. Astronomy was observed in the night sky, not only read about in manuscripts. This integration of theory and practice, of knowing and doing, prefigures what we now call experiential learning — a tradition theorized by John Dewey (1938) and formalized in David Kolb's (1984) experiential learning cycle, which posits that genuine learning requires concrete experience, reflective observation, abstract conceptualization, and active experimentation working together.

The contextual embeddedness of Gurukul learning also anticipates situated cognition theory, which argues that knowledge is inseparable from the activity, context, and culture in which it is developed and used (Brown et al., 1989). When learning is decontextualized — reduced to abstract symbols on a page — it tends to remain inert and unusable. When it is rooted in genuine practice and meaningful context, it becomes alive and transferable. The Gurukul built this contextual richness into its very architecture.

Value-Based and Ethical Education

Running through all of these principles is a commitment to moral formation. The Gurukul was explicitly concerned with producing not just skilled individuals but virtuous ones — people who would use their knowledge in service of others and in harmony with larger ethical obligations. The guru modeled this orientation through their own life. Values were not taught as a separate subject but woven into every dimension of daily experience (Kumar, 2015; Misra, 2013).

This emphasis on character alongside competence is increasingly recognized as urgent in contemporary education. The OECD's (2019) Learning Compass 2030, for example, identifies student agency, responsible action, and ethical values as foundational to twenty-first-century education. In a world where AI systems themselves raise profound ethical questions, the need to develop ethically informed citizens and future professionals has never been more pressing. The Gurukul's insistence that knowledge without virtue is dangerous remains as pertinent today as it was three thousand years ago.

Generative AI and Educational Technology: A Contemporary Landscape

Artificial intelligence in education is not new — rule-based tutoring systems have existed since the 1970s — but the emergence of Generative AI in the last several years represents a qualitative leap in capability and ambition. Where

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earlier AI systems followed fixed decision trees, modern large language models (LLMs) like GPT-4 and Claude can engage in open-ended dialogue, generate original explanations tailored to a learner's question, produce worked examples across virtually any domain, offer detailed feedback on written work, and adapt their register and complexity to suit different audiences (Baidoo-Anu & Ansah, 2023; Kasneci et al., 2023).

Intelligent Tutoring Systems

Intelligent Tutoring Systems (ITS) represent one of the most developed applications of AI in education. Systems such as Carnegie Learning's MATHia, ALEKS, and Khanmigo use sophisticated models of student knowledge — tracking which concepts have been mastered, which remain fragile, and which are entirely missing — to guide learners through customized pathways (VanLehn, 2011). Research evidence on their effectiveness is substantial: a comprehensive meta-analysis found that ITS produce learning gains roughly equivalent to human one-on-one tutoring, which Bloom (1984) identified as the gold standard of educational intervention (Ma et al., 2014). This is a remarkable result. The machines are not replacing human tutors, but they are approximating some of the most powerful features of individualized human instruction.

Adaptive Learning Platforms

Adaptive learning platforms — systems that continuously adjust content difficulty, sequence, and format based on ongoing assessment of student performance — extend the ITS concept to broader curricular domains. Platforms like Knewton, Smart Sparrow, and DreamBox use machine learning algorithms to build dynamic models of each learner and deliver instruction calibrated to their current state of understanding (Dede & Richards, 2012). The key word here is dynamic: unlike a fixed textbook or a pre-planned lesson, an adaptive system updates its model of the learner with every interaction, recalibrating in real time in ways that no human teacher managing an entire classroom can realistically do.

Learning Analytics

Learning analytics refers to the measurement, collection, analysis, and reporting of data about learners and their contexts, with the purpose of understanding and optimizing learning and the environments in which it occurs (Siemens & Long, 2011). Rich data streams from digital learning environments — time on task, error patterns, help-seeking behavior, engagement metrics — can be processed to identify struggling students before they fail, to understand which instructional approaches are working for which learner profiles, and to flag students who may need emotional or social support alongside academic intervention. When used well, learning analytics transforms the opacity of learning processes into something visible and actionable for both teachers and learners.

Generative AI Assistants

The most recent and perhaps most versatile addition to the educational AI toolkit is the large-language-model-based generative assistant. These tools — whether accessed through dedicated educational platforms or general-purpose interfaces — can serve as on-demand tutors, writing coaches, study partners, and content generators. A student struggling with a concept at eleven o'clock at night can receive a thoughtful, contextually responsive explanation without waiting for the next school day. A teacher preparing materials for a diverse classroom can generate multiple versions of an explanation at different reading levels in a matter of minutes (Kasneci et al., 2023). Baidoo-Anu and Ansah (2023) describe Gen AI's potential in education as encompassing content generation, personalized feedback, assessment support, language learning scaffolding, and accessibility enhancement for learners with disabilities — a range that is both impressive and, to many educators, somewhat daunting.

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A Conceptual Framework: Mapping Gurukul Wisdom onto AI Capabilities

The preceding sections have outlined two distinct knowledge systems: the pedagogical principles of the Gurukul on one side, and the functional capabilities of modern educational AI on the other. This section proposes a conceptual framework that brings them into dialogue — not by forcing a mechanical equivalence, but by identifying genuine structural resonances that can guide educational design.

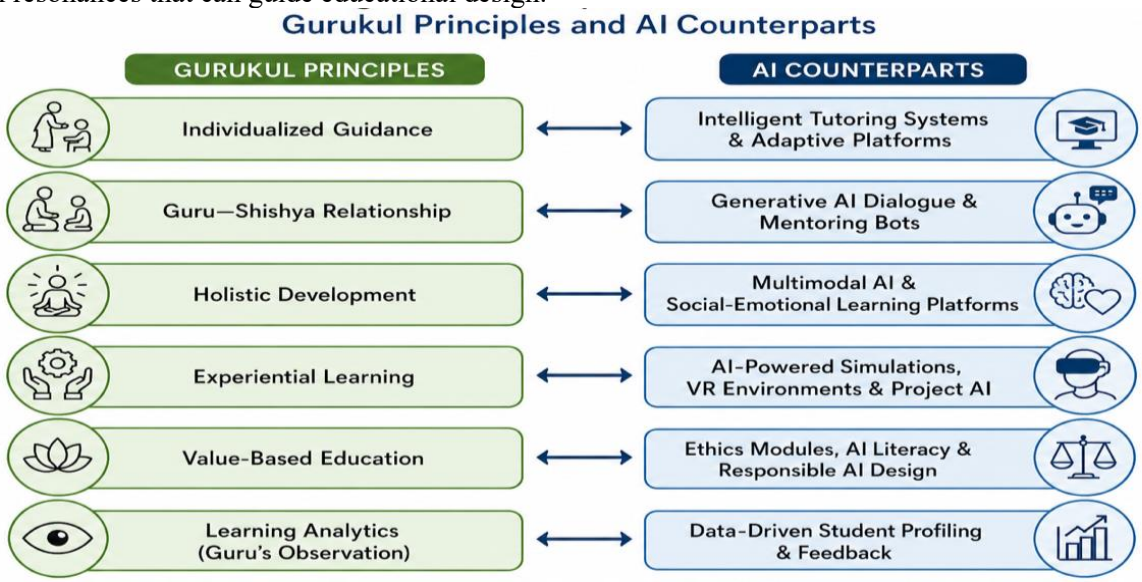

Figure: Conceptual Framework — Gurukul Principles and AI Counterparts

The framework is organized around six correspondences. First, the Gurukul's individualized guidance maps onto intelligent tutoring systems and adaptive learning platforms — both aim to calibrate instruction to the learner's specific level and need, rather than delivering a uniform experience to all. Second, the guru-shishya relationship finds a partial and necessarily imperfect analog in generative AI dialogue — the capacity for AI systems to engage in sustained, responsive, question-and-answer interaction that attends to what the individual learner is asking and struggling with. Third, the Gurukul's commitment to holistic development points toward the use of multimodal AI tools and social-emotional learning platforms that attend to dimensions of development beyond the purely cognitive (Zawacki-Richter et al., 2019).

Fourth, the tradition of experiential learning maps onto AI-powered simulations, virtual reality environments, and project-based learning tools that embed academic content in meaningful, activity-rich contexts. Fifth, and most critically, the Gurukul's value-based education dimension finds its contemporary expression not only in specific ethics curriculum modules but in the broader project of AI literacy and responsible AI design — preparing students not just to use AI tools but to understand, interrogate, and ethically evaluate them (OECD, 2019). Sixth, the guru's intimate, longitudinal observation of each student is extended and formalized by learning analytics, which can track developmental patterns over time and surface insights that no individual teacher could hold in mind across an entire cohort.

It is important to be explicit about what this framework is and what it is not. It is not an assertion that AI can replicate what a human guru does — the depth, warmth, wisdom, and moral exemplarity of the guru-shishya bond is irreducibly human. Rather, it is a claim that AI tools, when designed with these pedagogical principles consciously in mind, can support and extend what human teachers do, making it possible to offer more individualized, responsive, and holistically conceived education to more learners, including those who have historically been underserved by standardized systems.

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Opportunities, Limitations, and Ethical Concerns

Opportunities

The integration of Gurukul-informed pedagogical principles with AI tools opens several compelling opportunities. Scalability is the most immediately obvious. The Gurukul, in its classical form, was available only to a privileged minority — typically upper-caste male students in proximity to a renowned guru. AI has the potential to bring individualized, high-quality learning experiences to millions of learners in geographically remote areas, low-resource schools, and communities that have been systematically excluded from quality education (Popenici & Kerr, 2017). A student in a rural district who lacks access to a well-qualified mathematics teacher can, through an intelligent tutoring system or a generative AI assistant, receive responsive, personalized mathematical guidance. This is a democratizing potential that must not be understated.

Beyond access, AI enables a kind of persistent learner support that human teachers simply cannot provide. The guru's continuous presence in the shishya's life was one of the most educationally potent features of the Gurukul — and it is a feature that conventional schooling eliminated almost entirely. AI tutoring systems can be available at any time, in any place, patiently responding to the same question for the fifth time without frustration or judgment. This always-on availability is particularly valuable for learners with irregular schedules, family responsibilities, or the anxiety that makes asking a classroom question feel impossibly risky (VanLehn, 2011).

For teachers, AI tools offer relief from the most time-consuming and least intellectually rewarding aspects of their work — routine assessment, administrative data management, the generation of basic instructional materials. When teachers are freed from these burdens, they can invest more of their energy in the relational, mentoring, and community-building work that AI cannot and should not replace. In this sense, thoughtfully deployed AI can make teachers more guru-like, not less.

Limitations

Honest appraisal requires acknowledging the real and significant limitations of AI in education. The most fundamental is the gap between information provision and genuine understanding. Current AI systems, however impressively fluent, do not understand what they say in the way that a human teacher understands. They process patterns in data and generate statistically probable continuations. This means they can be confidently wrong — producing plausible-sounding explanations that are factually incorrect or subtly misleading (Kasneci et al., 2023). Students who lack the background knowledge to detect such errors are particularly vulnerable. The guru's wisdom was not just knowledge but judgment — the capacity to know what a particular student needed to hear, in what form, at what moment. That kind of contextual wisdom remains well beyond the reach of current AI.

There are also serious concerns about depth of learning. AI tutoring systems are effective at supporting procedural knowledge — the kind of step-by-step skill that can be broken into identifiable components and practiced discretely. They are considerably less effective at fostering the kind of deep conceptual understanding, creative thinking, and genuine intellectual curiosity that the best human teachers inspire (Cuban, 2001). The Gurukul's emphasis on deep, prolonged engagement with ideas — the slow maturation of insight through years of living with a brilliant teacher — is not something that any current AI system can approximate.

Infrastructure and access present practical limitations as well. AI-powered personalized learning requires reliable internet connectivity, functioning devices, and technical support — conditions that are far from universal, particularly in the low-resource contexts where personalized learning is most needed. The risk of a two-tiered educational system, in which well-resourced learners benefit from sophisticated AI tools while disadvantaged learners are left with either nothing or low-quality digital content, is real and must be actively contested (UNESCO, 2021).

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Ethical Concerns

The ethical dimensions of AI in education are both numerous and serious. Data privacy is perhaps the most immediately pressing. Learning analytics and adaptive systems work by collecting detailed behavioral data about students — their errors, their hesitations, their help-seeking patterns, their time on task. This data, in the wrong hands or without appropriate safeguards, can be used in ways that harm rather than help learners (Slade & Prinsloo, 2013). Children and adolescents are entitled to privacy in their learning processes, and educational institutions must maintain rigorous data governance frameworks. Informed consent — genuinely informed, not buried in impenetrable terms-of-service documents — is a minimum ethical requirement.

Algorithmic bias presents a subtler but equally important concern. AI systems learn from historical data, and historical data reflects historical inequities. If an adaptive system is trained primarily on data from affluent, majority-culture students, its models of 'typical' learning trajectories may systematically disadvantage students from different cultural, linguistic, or socioeconomic backgrounds — reproducing and potentially amplifying the very inequities that personalized learning promises to address (UNESCO, 2021). The Gurukul's sensitivity to individual student identity and background must be translated, in the AI context, into deliberate efforts to design systems that are culturally responsive and bias-aware.

There is also the concern of over-dependence and the erosion of human connection in learning. If students come to rely primarily on AI for educational support, the human relationships that are central to both the Gurukul ideal and the empirical evidence on effective learning may atrophy. Education is not simply about information transfer — it is about becoming, through relationships with others who model what it means to be curious, rigorous, caring, and committed to truth. No AI system, however sophisticated, can model this in the way that a human teacher can. Designing AI tools that augment rather than replace human educational relationships is not just a technical challenge but an ethical imperative.

Practical Applications in the Classroom

The principles and arguments developed in previous sections have concrete, actionable implications for classroom practice. The following applications are grounded in the Gurukul-AI framework and designed to be feasible across a range of educational settings.

AI-Augmented Differentiated Instruction: Teachers can use adaptive learning platforms to create differentiated learning pathways within a single classroom. At the start of a unit, an AI-powered diagnostic assessment identifies each student's current knowledge state and misconceptions. The platform then generates individualized pathways — some students may need remedial work on foundational concepts before approaching the unit's core content, while others who have already mastered the basics can be offered extension challenges. The teacher, freed from the logistically impossible task of managing thirty simultaneous individual plans manually, can focus their attention on students who need human support, facilitating deeper discussions, addressing emotional barriers to learning, and building relationships. This is the Gurukul's individualized guidance realized through technological leverage.

Generative AI as Socratic Dialogue Partner: The Gurukul's dialogic pedagogy — the sustained questioning and counter-questioning through which understanding was built — can be partially replicated through structured use of generative AI tools. Students can be taught to use AI assistants not as answer machines but as Socratic interlocutors, posing follow-up questions, challenging initial responses, and using AI-generated explanations as starting points for deeper investigation rather than endpoints. Teachers can design specific prompting protocols — 'Ask the AI to explain this concept, then ask it to give you a real-world example, then ask it to explain the biggest counterargument' — that train students in the habits of dialogic inquiry. Critically, this must be scaffolded by a teacher who models what genuine intellectual curiosity looks like. The AI can facilitate dialogue; only the human teacher can embody it.

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Learning Analytics for Teacher Insight: Learning management systems with analytics capabilities can give teachers a real-time dashboard of student engagement and progress — not to surveil students, but to extend the teacher's vision in the way the guru's continuous co-habitation extended theirs. A teacher who knows that a particular student's error patterns suggest a systematic conceptual misunderstanding (rather than random mistakes) can intervene more precisely and effectively. A teacher who can see that a student has been struggling for forty minutes on a single problem can check in with sensitivity and timeliness. Used in this way, learning analytics is a tool for deepening teacher attention, not replacing it.

AI-Supported Experiential Learning Projects: The Gurukul's integration of theory and practice can be operationalized through AI-supported project-based learning. Students might investigate real environmental data using AI analytics tools, design solutions to community problems with AI as a research and prototyping assistant, or explore historical events through AI-generated immersive narratives that situate factual content in humanly compelling story. In each case, the AI expands the space of what is experientially possible within a classroom context, without sacrificing the rootedness in real-world problems and genuine consequences that makes experiential learning educationally powerful.

AI Literacy as Value-Based Education: Perhaps the most important classroom application of the Gurukul-AI framework is the explicit integration of AI literacy and ethics into the curriculum. Students who are learning with AI tools must simultaneously learn about them — their capabilities and limitations, how they are built and trained, what data they use, who controls them, and what values and assumptions are embedded in their design. This is value-based education for the twenty-first century. It produces learners who are not passive consumers of AI output but active, critical, ethically informed citizens capable of both using AI effectively and questioning it wisely (OECD, 2019; Baidoo-Anu & Ansah, 2023). The guru taught students not just knowledge but the capacity to evaluate knowledge. This remains the highest educational aspiration.

Conclusion: Toward Learner-Centered, Inclusive, and Future-Ready Education

The central argument of this chapter is simple yet significant. Effective education has always depended on meaningful guidance, individualized attention, and the development of both knowledge and character. The Gurukul system embodied these principles through close teacher–student relationships, personalized instruction, and a holistic approach to learning. However, the scale and structure of modern education have often made such individualized learning difficult to achieve.

Generative AI and related educational technologies do not automatically solve this challenge. They cannot replace the human relationships that remain essential to authentic education. Moreover, they bring important concerns, including algorithmic bias, privacy risks, learner over-dependence, and the possibility of reinforcing educational inequalities. Addressing these issues requires strong ethical frameworks, institutional support, and responsible governance alongside technological advancement.

Nevertheless, when guided by sound pedagogical principles, AI offers substantial opportunities. It can enhance teachers' ability to understand individual learners, provide personalized assistance beyond classroom boundaries, and support interactive, experiential, and context-rich learning experiences at scale. Used responsibly, AI can help move education closer to the long-standing ideal of meeting each learner's unique needs.

The integration of Gurukul wisdom with Generative AI is neither an exercise in nostalgia nor merely a cultural reflection. Rather, it represents a meaningful effort to combine enduring educational insights with contemporary technological capabilities. Such a framework seeks to create learning environments that are learner-centered yet community-oriented, technologically advanced yet deeply humanistic, and scalable without losing personal relevance.

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Ultimately, both the Gurukul tradition and Generative AI share a common objective: helping learners realize their fullest potential through personalized support and meaningful engagement. If educators, policymakers, and technologists can balance innovation with ethical responsibility, the convergence of ancient pedagogical wisdom and modern AI may contribute to a more inclusive, personalized, and future-ready educational system.

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INDIAN KNOWLEDGE SYSTEM AND SELF-REGULATED LEARNING: AN INTEGRATIVE FRAMEWORK FOR MODERN EDUCATION AND PSYCHOLOGY

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Abstract: Self-Regulated Learning (SRL) has become one of the most important concepts in the educational psychology of today. The learners are identified as capable of planning, monitoring, controlling and evaluating their own learning. Though the Western frameworks proposed by Zimmerman, Pintrich, Bandura, and Boekaerts are powerful and valid theoretical models, they tend to be largely cognitive and behaviourist in nature, with little attention paid to the spiritual, ethical, and holistic nature of learning. The Indian Knowledge System (IKS), which includes the Bhagavad Gita, Patanjali's Yoga Sutras, the Guru-Shishya tradition and Vedantic psychology, contains a wealth of ideas around self-regulation that can meaningfully supplement contemporary SRL theory and practice. Through conceptual and integrative analysis, the chapter ascertains main similarities in components of SRL and constructs of IKS, especially along the lines of Sankalpa (goal setting), Swadhyaya (self-directed study), Samatva (equanimity), and Karma Yoga (purposeful action). Academic procrastination is viewed as a failure of self-regulation and approached through an IKS lens. A new integrative framework, IKS-Based Self-Regulated Learning (IKS-SRL), is proposed for contemporary educational and counselling contexts. The chapter aims to expand the epistemic resources of educational psychology by rooting psychological theories in the classical traditions of India.

Introduction

Contemporary Challenges in Modern Education

Contemporary education systems are facing enormous challenges globally. The surge in academic stress, disengagement, procrastination and mental health problems is symptomatic of a much deeper crisis in our understanding of learning and its support (Odaci and Cikrikci, 2014). Students often struggle because they cannot control their own cognition, emotions, behaviour, and motivation; self-regulated learning focuses on these. The National Education Policy 2020 (NEP 2020) recognises the shortcomings of rote learning, defined as the memorising of information without comprehension. The NEP 2020 also advocates for the promotion of education that fosters critical thinking, ethical values, and lifelong learning. These ideas are present in the classical knowledge traditions of India (Ministry of Education, Government of India, 2020).

Emergence of Self-Regulated Learning in Educational Psychology

The concept of self-regulated learning emerged as a formal construct in the 1980s and 1990s, within the framework of social cognitive theory (Bandura, 1986) and Zimmerman's initial conceptualisation (1989). Self-regulated learning involves taking charge of one's learning experience; thereby, it is a process that is active and not passive. Despite the strong empirical support for contemporary theories, assumptions underpinning the development of contemporary self-regulated learning (SRL) theories are largely Western. These largely Western assumptions privilege individual agency and rational cognition over the relational, ethical, and spiritual dimensions of learning (Pintrich, 2000; Zimmerman and Schunk, 2011).

Relevance of Indian Knowledge System in the Twenty-First Century

India's intellectual heritage includes a highly developed understanding of mind, thought, will, learning and self-discipline. The systems of philosophy, psychology, and pedagogy of the Vedas, Upanishads, Bhagavad Gita, and Yoga provide immense potential for IKS. These treatises address consciousness, cognition, self-regulation, and the

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purpose of learning. The Patanjali Yoga Sutras were introduced with the definition of yoga as "Yogah Chitta Vritti Nirodhah", which refers to the limitation of mind movements (Yoga Sutras 1.2). This text offers an extended description of mental restraint and self-control. This definition precedes cognitive science by thousands of years (Bryant, 2009). The inclusion of IKS in NEP 2020 is significant and has positive institutional recognition, but it also requires well-thought-out conceptual conversations ones that recognise meaningful convergence and propose a framework that is culturally relevant and scientifically valid.

Rationale and Objectives of the Chapter

This chapter argues that IKS offers purposeful self-regulation principles goal-setting, reflective practice, disciplined action, emotional balance, and inner inquiry that are similar and can substantially enrich modern SRL models. An integrative approach is suggested between IKS and Western psychology rather than being mutually exclusive. The purpose of the chapter is to: (a) review important self-regulated learning frameworks; (b) highlight the educational and psycho-epistemological foundations of IKS; (c) note the convergence between IKS and self-regulated learning; (d) analyse the issue of academic procrastination through the lens of IKS; (e) propose the integrative IKS self-regulated learning framework; and (f) present the implications of the framework for modern education, counselling, and educational psychology.

Understanding Self-Regulated Learning: Psychological Perspectives

Concept and Definitions

Self-regulated learning refers to learners taking an active and constructive part in their own learning Zimmerman (2000) states that the degree to which students are metacognitively, motivationally, and behaviourally active participants in their own learning is defined as SRL. Pintrich (2000) describes it as a self-directed process involving goal monitoring, cognitive resource management, motivational regulation, and behavioural adaptation. What makes SRL different from any learning potential is its focus on learner agency, intention and reflection, which IKS has been practising in a systematic manner for centuries.

Historical Development and Major Theoretical Models

The historical origins of self-regulated learning come from the intersection of three areas of psychology, namely cognitive, behavioural and motivational. These fields came together between the 1970s and the 1980s. Flavell (1979) showed that learners differ in their awareness of and control over their cognitive processes. Bandura (1977, 1986) put forth the notion of self-efficacy as a crucial motivational underpinning of self-regulation. Zimmerman and Martínez-Pons (1986) later pinpointed particular strategies that high-achieving students deploy, like self-regulating, goal-setting, and self-evaluating. This empirical research around SRL laid a solid foundation for it, which has surged substantially over the following decades (Zimmerman, 2013).

Zimmerman's Social Cognitive Model. Pintrich's Model. Zimmerman (2000) suggested a cyclical model including three phases: forethought (goal-setting and strategy formulation), performance (strategy execution and self-monitoring), and self-reflection (evaluating results and adjusting the future). This constant feedback cycle helps learners improve their self-regulatory approach based on experience.

Pintrich's Model. Pintrich (2000) presented a four-phase model that simultaneously incorporated cognition, motivation, behaviour, and context. He uniquely emphasised the importance of motivational regulation and social and environmental conditions that facilitate or inhibit self-regulation, rather than purely individualistic learning.

Bandura's Self-Efficacy Perspective. Bandura (1997) believes that self-efficacy beliefs are the motivational pillar of SRL. If learners have confidence in their ability to learn, they will establish challenging goals and persist in their pursuit, even in the face of difficulties. On the other hand, low self-efficacy predicts avoidance, procrastination, and disengagement from the learning task.

Boekaerts' Model of Adaptable Learning. Boekaerts (1999) proposes a six-component model of self-regulated learning that integrates cognitive processes and motivational processes in a dual-processing framework. The model she purports differentiates between a "growth pathway" in which students pursue mastery goals and expand competence, as well as a "well-being pathway" in which students seek emotional safety and avoid threats. Boekaerts

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stressed that emotion regulation and motivational beliefs are at the core of SRL. This suggestion fits perfectly with IKS, which regards affective equanimity as a precondition of learning.

Components of SRL and Limitations of Contemporary Approaches

Essential elements of processes involving self-regulated learning (SRL) are setting goals, self-monitoring, self-control, self-evaluation, self-reflection, and motivation regulation (Boekaerts, 1999; Schunk & Zimmerman, 2008). Despite their substantial empirical value, current SRL frameworks have a limited scope. Numerous frameworks of learning have been developed over the years. Nevertheless, a considerable disadvantage of these frameworks is that they are largely grounded in the individualistic perspective of the West, which emphasises the cognitive, motivational, and behavioural aspects of learning. However, many of these frameworks have relatively overlooked issues, such as cultural, ethical, and spiritual development. Much has been learned about purposeful action. However, a theoretical examination of deeper sources has never been done before. While mindfulness-based approaches have been integrated into SRL research (Hagger et al., 2022) recently, they continue to remain on the fringes of popular theories. These limitations make a meaningful dialogue possible between contemporary theories of Self-Regulated Learning (SRL) and Indian Knowledge Systems (IKS), which offer a more complete and wholesome understanding of oneself, consciousness, values, meaningful learning, etc.

Section Summary: *Self-regulated learning (SRL) reflects students' active regulation of cognition, motivation, and behaviour. Models proposed by Zimmerman, Pintrich, Bandura, and Boekaerts are all strong frameworks. However, their individualistic and cognitively narrow orientation creates an opening for the holistic resources of IKS.*

Indian Knowledge System: Educational and Psychological Foundations

Meaning and Scope of Indian Knowledge System: The IKS is a constantly evolving body of philosophical, psychological, and pedagogical knowledge that has been built up over millennia on the Indian subcontinent (Ministry of Education, Government of India, 2020). It comprises the six orthodox philosophical schools, the Upanishads, the Bhagavad Gita, Yoga, Ayurveda, and other traditions that focus on consciousness, cognition, and ethical development. Indigenous knowledge systems are not a fossil but a living tradition that can account for the human being in its totality; that is, a human being who not only acts but also thinks, feels, wishes, and is motivated by a moral sense and a spiritual longing. In this worldview, restricting knowledge systems to the discipline boundaries that characterize modern academic knowledge is a poor attempt. (Dalal, 2011)

Educational Philosophy in Ancient India: Ancient Indian educational philosophy was very purposive and value-oriented. Education's purpose was not vocational or technical training but to bring about the highest development of a human being as a moral and spiritual entity. The command of the Taittiriya Upanishad, 'Satyam Vada, Dharmam Chara' (Speak truth, practice righteousness), encapsulates this ethical orientation. Education was inseparable from character building and the inculcation of Viveka (discriminatory wisdom). Mookerji (1947/1989) wrote that Nalanda and Takshashila exemplified this integrative vision and were places of rigorous intellectual inquiry and ethical and contemplative practice across a range of disciplines. This model of education, envisioned centuries ago, focuses on enlightenment and values.

Guru-Shishya Tradition as a Model of Learning: The Guru-Shishya (teacher-student) tradition is a distinctive pedagogical model in which the teacher assumes total responsibility for the students' intellectual, moral, and spiritual development. The Guru modeled equanimity, ethical conduct, and other ideas that the Shishya internalized through proximity, observation, and discipline. This model anticipates modern-day relational pedagogy and mentoring approaches while placing self-receptivity and self-disciplined effort at the center of the learning process. The Guru-Shishya model's relational depth also anticipates Vygotsky's idea of the zone of proximal development and social constructivist theories of scaffolded learning.

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Swadhyaya and Self-Directed Learning: "Swadhyaya" means "self-study through personal enquiry and reflection" (from "swa", "self", and "adhyaya", "study"). According to Bryant (2009), it comes as the fourth Niyama of Patanjali, and it not only means study of the text but also self-study. In other words, 'swadhyaya' refers to the study of the consciousness that exists within you. Swadhyaya's congruence with contemporary ideas of self-directed learning and metacognition is evident. What makes it totally unique, though, is its offering of a reflective and existential dimension that purely cognitive accounts cannot provide.

Psychological Concepts in Indian Thought: Indian philosophical psychology presents an advanced model of the psyche. The Samkhya-Yoga tradition identifies manas (the lower mind, of sensory processing and reactive emotion); buddhi (the discriminative intellect that makes wise judgement and discernment); chitta (the greater field of consciousness that includes memory and the storehouse of impressions or Samskaras); and ahamkara (the sense of self that produces attachment and reactivity) (Dasgupta, 1922/2004). A framework in modern terms, that of executive function, metacognition, emotional regulation, and identity, provides a culturally and psychologically rich vocabulary of self-regulation.

Holistic Development and Its Educational Significance: IKS emphasises the interconnectedness of knowledge, character, and practice. According to Vedantic tradition, education is envisaged not only for intellectual development but also for moral purification (Chitta Shuddhi) and the ability to control the internal environment over a sustained time. The focus on the integrated formation of the whole person is consistent with modern research on social-emotional learning, the importance of non-cognitive competencies in achieving academic and life success, and much more but also points towards the development of the learner's moral and spiritual growth.

Section Summary: *IKS has a comprehensive and profound psychological learning framework. The concept of SWADHYAY, the Guru-Shishya tradition, the inner faculties of Manas, Buddhi, Chitta, and Ahamkara, and a focus on holistic personal development can be considered a key starting point for a dialogue with SRL theory*

Convergence between Indian Knowledge Systems and Self-Regulated Learning

The concept of IKS and SRL is deep and meaningful in education. Table 1 provides a systematic overview of the major correspondences identified across these two traditions. The subsequent subsections will elaborate in detail on the most substantive of these convergences.

Table 1

Convergence Between Indian Knowledge System Concepts and Self-Regulated Learning Components

IKS Concept	Primary Source	SRL Componen	Point of Convergence
Sankalpa (Purposeful resolve	Bhagavad Gita; Yoga Sutras	Goal Setting	Both involve deliberate intention formation; Sankalpa extends SRL goal-setting to ethical and existential purpose beyond mere academic outcomes.
Swadhyaya (Self-study)	Patanjali Yoga Sutras 2.44	Self-Monitoring & Metacognition	Both require learner-directed reflective inquiry; Swadhyaya adds contemplative inner observation beyond cognitive self-tracking.
Samatva (Equanimity)	Bhagavad Gita, Ch 6	Emotion Regulation	Both emphasise affective stability for sustained learning; Samatva provides a philosophical and practical framework absent in mainstream SRL.
Karma Yoga (Selfless action)	Bhagavad Gita 2.4 (Radhakrishnan, 1948)	Intrinsic Motivation	Both privilege process over outcome; Karma Yoga grounds intrinsic motivation in ethical obligation rathe than individual preference alone.

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IKS Concept	Primary Source	SRL Componen	Point of Convergence
Ashtanga Yoga (Eight-limbed path	Patanjali Yoga Sutras	Self-Control	Both address regulation of attention, impulse, and behaviour; Yoga extends SRL self-control to somatic, ethical, and contemplative dimensions.
Viveka / Pratyahar (Discrimination; Sense withdrawal)	Samkhya-Yoga; Yoga Sutras	Self-Monitoring & Self-Control	Both develop the capacity to distinguish productive from unproductive mental activity; IKS provides structured experiential practices for this skill.
Sakshi Bhava (Witness consciousness)	Yoga Sutras 1.2; Vedanta	Metacognition	Both cultivate an observing awareness of cognitive and emotional processes; Sakshi Bhava offers an experientially deeper metacognitive orientation than cognitive monitoring alone.
Tapas (Disciplined effort)	Patanjali Yoga Sutras 2.43	Motivation Regulation & Persistence	Both address sustained volitional effort; Tapas connect persistence to character formation and moral development, not merely task completion.
Guru-Shishya (Teacher-student bond)	Vedic tradition; Upanishads	Social & Contextual SRL	Both recognise expert guidance in learning; Guru-Shishya extends mentoring to transformative relational and moral dimensions of development.
Atma-Bodha (Self-knowledge)	Vedanta; Upanishads	Self-Reflection	Both involve evaluative inquiry into one's learning; Atma-Bodha deepens SRL self-reflection to existential and identity-level understanding.

Note. IKS = Indian Knowledge System; SRL = Self-Regulated Learning. Sources: Bryant (2009); Radhakrishnan (1948); Rao & Paranjpe (2016); Zimmerman (2000); Pintrich (2000); Boekaerts (1999).

Swadhyaya and Autonomous Learning: The IKS concept of Swadhyaya is structurally similar to the SRL principle of autonomous, self-directed learning. Both emphasize the learner's active engagement, independent inquiry, and reflective capacities that enable them to continue learning beyond formal instruction. Nevertheless, Swadhyaya extends self-learning by rooting it in intuitive or contemplative inner observation. This self-study involves not only the content but also an examination of our motivations, assumptions, and habitual thoughts. A contemporary cognitive approach provides theorists with metacognitive depth, but they have yet to understand this depth in experiential terms.

Sankalpa and Goal Setting: The word "Sankalpa," which means a solemn and purposeful resolve, is similar to the SRL component of goal setting but has a more profound meaning. While the goals of self-regulated learning (SRL) are defined in specific, measurable academic terms, Sankalpa connects the learner to an inner intention that is anchored deeper in purpose, ethical commitment, and dharmic obligation. When a learner forms a sankalpa, they align their will with their values and aspirations. Studies in positive psychology and self-determination theory suggest that motivating ourselves through goals that are purposeful and autonomy-supportive is beneficial for motivation and well-being (Deci & Ryan, 2000; Ryan & Deci, 2020). This IKS principle enjoys strong empirical convergence.

Yoga and Development of Self-Control: Patanjali's Ashtanga Yoga System Provides a Detailed and Sequenced Way to Develop Self-Control. The Yamas (ethical restraints) and Niyamas (personal observances) set out the moral axioms; Asana and Pranayama set stronger somatic and physiological self-regulation; Pratyahara, Dharana, and Dhyana progressively cultivate attention, focus, and sustained awareness. The foundational Sutra "Yogah Chitta Vritti Nirodhah" (Yoga Sutras 1.2) describes the ultimate aim of mental self-regulation as the complete mastery of mental fluctuations. This formulation is arguably the most comprehensive account of self-control among any classical tradition (Bryant, 2009). An integrated system addressing physical, emotional, cognitive, and moral dimensions of

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self-regulation is what this practice constitutes together. These dimensions are treated separately, if at all, in contemporary SRL frameworks (Rao & Paranjpe, 2016).

Bhagavad Gita and Regulation of Mind: The Bhagavad Gita has teachings on mind regulation that are psychologically sophisticated and deepen modern SRL theory. The self-controlled person, according to Krishna, is someone who has mastered the senses, managed the mind, and has equanimity (Samatva) towards success and failure in Chapter 6 of the Gita. Samatva is especially important for the SRL because it describes a positive affect that enables an individual to engage in challenges without becoming distorted or frustrated. This quality is an attribute that is similar to Boekaerts' (1999) "growth pathway," where the learning proceeds from a position of affective stability rather than emotional reactivity or self-protective avoidance.

Karma Yoga and Intrinsic Motivation: Karma yoga, the discipline of selfless action, offers us a profound model of intrinsic motivation. Krishna's injunction to perform action without attachment to its fruits (Radhakrishnan, 1948, 2.47) is a fundamental process-focused motivational orientation. The statement aligns with the concept of intrinsic motivation from Self-Determination Theory, whereby an individual values the act of being engaged because of its inherent meaningfulness rather than receiving a reward from an external source (Deci and Ryan, 2000; Ryan and Deci, 2020). Researchers have shown that intrinsic motivation leads to deeper learning and persistence while extrinsic motivation has the opposite effect (Vansteenkiste et al., 2006). Nevertheless, Karma Yoga provides further depth by rooting intrinsic motivation in ethical obligation and commitment to the community, thereby adding a moral meaning dimension that SDT does not fully theorize.

Mindfulness, Metacognition, and Character Development: The concept of sakshi bhava (witness consciousness, Yoga Sutras 1.2), as delineated in the Yoga Sutras, is a deliberate practice, rather than a mere passive inner witness, that encourages the cultivation of an observing awareness that watches over the contextual stream of information in the mind without identification with it. This awareness arises as a product of metacognition, which goes beyond the cognitive monitoring strategies, as described in the mainstream SRL literature. Empirical studies report that the use of contemplative practices has positive effects on metacognitive awareness and academic self-regulation (Hagger et al., 2022; Zoogman et al., 2015). The ethical foundation of the learning process, which includes the development of Satya (honesty), Tapas (self-discipline), and Karuna (compassion), is also a relevant aspect of IKS traditions that align with research showing that grit, conscientiousness, and overall non-cognitive competencies are strong predictors of academic achievement and sustained well-being (Duckworth et al., 2007).

Summary: *As shown in Table 1, the convergence of IKS and SRL is deep and multi-dimensional. The contribution of Sankalpa, Swadhyaya, Samatva, Karma Yoga, Sakshi Bhava, and the systematic framework of the Yoga Sutras seeks to enhance every key component of SRL, thus adding ethical, emotional, and contemplating dimensions that cannot be found in mainstream models.*

Academic Procrastination as a Failure of Self-Regulation: Insights from IKS

Understanding Academic Procrastination: Academic procrastination is the voluntary postponement of an intended activity despite the expectation of negative outcomes (Steel, 2007). Most college students, 70 to 95 percent, admit to having an issue with procrastination. Around half of the college students report chronic or problematic procrastination (Steel, 2007). Lower academic achievement, more anxiety, worse health, and less psychological well-being are associated with it. From the vantage point of SRL, procrastination is a basic failure of self-regulatory functioning; that is, the inability to coordinate goal-setting, self-monitoring, self-control, and motivation management. It usually involves a failure of emotion regulation in which relief from short-term discomfort related to the task overrules more far-reaching academic goals (Sirois & Pychyl, 2013). In fact, both Boekaerts' (1999) well-being pathway model and the Bhagavad Gita's Tamas analysis give remarkable insight into this failure.

Psychological Causes and Self-Regulation Deficits: The contributing factors to procrastination include low self-efficacy, fear of failure, perfectionism, impulsivity, and poor emotion regulation (Steel, 2007; Klingsieck, 2013).

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Students lacking in self-regulatory skills weak goal orientation, poor metacognitive awareness, and low self-efficacy are particularly prone to procrastination (Klassen et al., 2008). These deficits are mutually reinforcing in nature, as procrastinating behavior leads to poor outcomes that further reduce self-efficacy, motivation, and self-regulating ability. To interrupt this cycle will take interventions that get to the deeper motivational, affective, and characterological bases of self-regulation, an area where IKS has plenty to offer.

IKS Perspectives: Bhagavad Gita and Yoga: The Bhagavad Gita is very insightful regarding the psychology of inaction. According to Radhakrishnan (1948), Krishna refers to the psychological obstacle to purposive action as Tamas (inertia, lethargy, and confusion). The causes of failure and misery are delays, avoidance, and laziness, which follows a tamasic tendency. The Gita indicates that one should first cultivate Rajas (energy and directed activity) and finally Sattva (clarity, discrimination, and disciplined purposefulness). This developmental montage from inertia through activity to luminous self-regulated action closely resembles contemporary models of SRL skill development. Practices derived from yoga the pranayama reduce anxiety and improve prefrontal cognitive control (Brown & Gerbarg, 2012). Further, dharana (sustained concentration) strengthens the attentional capacities that have been weakened by procrastination. And swadhyaya, as the practice of honest self-observation, facilitates students' awareness of their avoidance patterns, task aversions, and self-defeating cognitive patterns with the clarity necessary for making genuine behavioral change.

Table 2

Academic Procrastination: Psychological Causes and IKS-Informed Interventions

Psychological Cause of Procrastination	SRL Deficit (Western Framework)	IKS Construct Addressed	IKS-Informed Interventio
Fear of failure; Low self-efficacy	Weak self-efficacy beliefs; Poor goal orientation	**Sankalpa; Viveka**	Purpose-aligned goal setting Discriminative self-inquiry
Emotion dysregulation; Task aversion	Poor emotion regulation; Short-term mood repair	**Samatva; Vairagya**	Pranayama; Dhyana; Non-attachment practices
Impulsivity; Distractibility	Low self-control; Poor attention management	**Dharana; Pratyahara**	Concentration practices; Sense-withdrawal training
Tamasic inertia; Behavioural avoidance	Motivation deficit; Behavioural disengagement	**Karma Yoga; Tapas**	Gita-inspired purposeful action; Disciplined daily practice
Negative self-talk; Poor self-monitoring	Inadequate metacognitive awareness	**Swadhyaya; Sakshi Bhava**	Reflective journaling; Witness-awareness meditation

Note. SRL = Self-Regulated Learning; IKS = Indian Knowledge System. Sources: Steel (2007); Klassen et al. (2008); Radhakrishnan (1948); Bryant (2009); Brown & Gerbarg (2012); Boekaerts (1999).

Implications for Student Development

As shown in Table 2, it takes more than time management training or cognitive restructuring to tackle academic procrastination. Counsellors and educational psychologists can use IKS-informed frameworks to assist students in creating Sankalpa (clear, ethically based intentions), achieving Samatva (affective stability in the face of challenging tasks), and practising Abhyasa (a sustained, disciplined daily practice).

Section Summary: *Academic procrastination reflects self-regulatory failure at cognitive, emotional, and motivational levels. The Bhagavad Gita's examination of Tamas, combined with the practices of the Yoga Sutras of disciplined awareness and concentrated action, offers insightful perspectives on counselling and student development.*

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Implications for Modern Education and Educational Psychology

Implications for School and Higher Education: In the context of school, the incorporation of IKS principles can transform learning. Practices informed by Swadhyaya, such as reflective journaling and constrained peer evaluation, foster metacognitive skills that research consistently identifies as critical to academic achievement. Regularly integrating yoga and pranayama in school has proven to increase attention, decrease anxiety, and enhance academic engagement (Khalsa et al. 2012). According to the Ministry of Education, Government of India, 2020, NEP 2020 prescribes the necessary policy and institutional framework for values education, experiential learning, and the inclusion of India's heritage and culture. In higher education, universities can embed a range of IKS-informed pedagogies, such as contemplative inquiry, Sankalpa-based project work, and Karma Yoga-oriented community engagement. We are seeing a growth of evidence of the efficacy of mindfulness-based learning interventions (Shapiro et al., 2011).

Implications for Teachers and Educational Psychologists: The Guru-Shishya tradition requires teachers to possess the qualities they wish to develop in students. When teachers develop their own capacities for self-regulation, equanimity, and reflective practice, they create classroom environments that organically support these in learners. Teacher-training programs can develop teachers personally and professionally when they can take into account evidence-based pedagogical strategies and IKS-informed practices. The IKS-SRL framework suggests that educational psychologists should develop tools for SRL assessment that are culturally relevant. Further, it should include constructs that are missing in standardized tools, such as purpose orientation, ethical commitment, and contemplative self-awareness. Furthermore, the framework suggests designs and evaluates IKS-informed intervention programs across a range of educational settings.

Implications for Counseling and Holistic Education: For counseling psychologists, IKS concepts such as Samatva, Vairagya (non-attachment), and the Yoga Sutras' model of progressive psychological integration offer culturally grounded frameworks for working with students grappling with anxiety, procrastination, identity issues, and lack of motivation. Yoga is an effective intervention for both anxiety and depression in adolescents and young adults (Cramer et al., 2013). A more expansive view of IKS challenges the simplistic conception of education solely as knowledge transmission or skill acquisition and encourages the integrated development of the person intellectually, morally, emotionally, and spiritually. This vision resonates with NEP 2020's focus on holistic, value-based education as well as with the positive psychology movement's call for education to help people flourish.

Section Summary: *Broadly, IKS-SRL has implications for school education, higher education, teacher development, educational psychology, and counseling. The growing base of empirical evidence supports these implications, and they are also in consonance with the policy directions of NEP 2020.*

An Integrative Framework of IKS-Based Self-Regulated Learning

Conceptual Framework: The IKS-SRL framework proposed in this chapter brings together the major components of contemporary SRL theory with IKS principles, resulting in a proposal for self-regulated learning that is culturally enriched and psychologically comprehensive. As per Table 3, the framework consists of a total of 7 core dimensions, ordered sequentially, which are from self-awareness to goal-oriented practice to regular and intentional practice to self-monitoring to emotional control to deeper self-reflection to self-transformation.

Table 3

The IKS-Based Self-Regulated Learning (IKS-SRL) Integrative Framework

Sl. No.	IKS-SRL Dimension	SRL Parallel	Educational Function	Pedagogical Practice
1	**Self-Awareness (Atma-Bodha)**	Metacognitive Awareness	Observe cognitive processes, emotional states, and habitual patterns with clarity and honesty.	Meditation; Journaling; Antar Avalokan (inner observation)

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Sl. No.	IKS-SRL Dimension	SRL Parallel	Educational Function	Pedagogical Practice
2	**Goal Orientation (Sankalpa)**	Goal Setting	Form purposeful, ethically grounded intentions aligned with values and aspirational identity.	Sankalpa practice; Values clarification exercises
3	**Self-Discipline (Yoga)**	Self-Control	Systematically cultivate physical, emotional, and cognitive self-regulation through structured practice.	Ashtanga Yoga; Pranayama; Asana
4	**Self-Monitoring (Swadhyaya)**	Self-Monitoring	Continuously observe progress, effort, and strategy effectiveness through reflective self-study.	Reflective journaling; Self-assessment rubrics
5	**Emotional Regulation (Samatva)**	Emotion Regulation	Cultivate affective equanimity as the stable foundation for sustained undistorted learning.	Dhyana (meditation); Breath-based regulation
6	**Self-Reflection (Atma Chintan)**	Self-Reflection	Inquire into the meaning, purpose, and ethical implications of one's learning and actions.	Structured reflection; Philosophical inquiry seminars
7	**Self-Transformation (Atma-Vikas)**	Lifelong Learning & Growth	Understand learning as holistic self transformation, not merely academic performance optimisatio	Community engagement; Karm Yoga service projects

Note. IKS-SRL = Indian Knowledge System-Based Self-Regulated Learning. The seven dimensions are presented in a developmental sequence from foundational self-awareness (Atma-Bodha) to holistic self-transformation (Atma-Vikas). Sources: Zimmerman (2000); Pintrich (2000); Boekaerts (1999); Bryant (2009); Radhakrishnan (1948); Rao & Paranjpe (2016).

Educational Significance and Relevance for Twenty-First Century Learners

The IKS-SRL framework is educationally important for several reasons. It offers a model that is culturally grounded and psychologically comprehensive in ways that are operational at different educational levels and in different contexts. The framework brings together the empirical efficacy of established SRL strategies with contemplative ethical practices, especially from IKS, making it both scientific and culturally rooted for the Indian learner. The addition of emotional regulation, ethical commitment, and purposeful dimensions directly addresses what research increasingly finds critical for deeper, sustainable learning (Boekaerts, 1999; Ryan & Deci, 2020), namely, the most remarkable limitations of cognitive SRL models. For twenty-first-century learners navigating information overload, rapid change, and existential uncertainty, cultivating Sankalpa, Samatva, Swadhyaya, and Atma-Bodha equips them to manage their studies effectively and to navigate life's broader challenges with clarity, purpose, and resilience.

Future Research Directions

The IKS-SRL framework presents spaces for several future investigations. The initial step is to study for the first time, systematically and empirically, IKS-derived practices (like yoga and meditation Swadhyaya, Sankalpa-based goal-setting, etc.) on SRL outcomes in Indian contexts. This can be done using culturally adapted and psychometrically validated SRL assessment tools. Longitudinal research following the evolution of IKS-SRL competencies from school-age through adulthood would strengthen the evidence base. In the next place, it is proffered that randomized controlled trials of IKS-informed interventions for academic procrastination, demotivational

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difficulties, and stress in higher education would generate the robust evidence necessary for wider institutional take-up. Fourth, qualitative and phenomenological research to capture students', teachers', and counselors' lived experiences of IKS-informed practices would ensure essential ecological validity and depth. Fifth, the construction of psychometrically sound instruments serving to measure dimensions of IKS-SRL, particularly one's purpose orientation, ethical commitment, and contemplative self-awareness, is an important and timely methodological opportunity. Ultimately, research on the cross-cultural comparability of IKS-SRL could greatly enhance global SRL research by testing its universality and cultural specificity.

Conclusion

This chapter argues that the Indian knowledge system contains rich and sophisticated principles of self-regulation, which can meaningfully enrich contemporary SRL theory and practice. Systematic scrutiny of the convergences between the IKS concepts of Swadhyaya, Sankalpa, Samatva, Karma Yoga and the framework for mental discipline in the Yoga Sutras and the main SRL components (as in Table 1) indicates that dialogue has conceptual coherence and functional significance.

The IKS-SRL framework proposed in Table 3 is a genuine integrative synthesis of the empirical rigour of modern educational psychology and the classical wisdom traditions of India. This contribution to educational psychology is not a nostalgic return to past practices but one that is principled and future-orientated. It takes the evidence seriously while also drawing upon the intellectual traditions of the world's oldest continuous civilisation. As shown in Table 2, the examination of academic procrastination more clearly demonstrates the pragmatic qualities of IKS. The self-regulatory failures that contemporary interventions target rely on deeper capacities of self-awareness, purposeful intention, and affective equilibrium, which IKS has developed over thousands of years.

As per NEP 2020, the Indian education sector of the future must strive for a real synthesis between ancient knowledge and modern knowledge, one that equally values solid empirical research and the depth of India's civilisation. The chapter tries to make a significant conceptual contribution to that important and timely project.

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AN INDIAN PERSPECTIVE ON STEM EDUCATION AND RELATED EFFORTS

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Abstract: STEM is the acronym for Science, Technology, Engineering, and Mathematics. STEM education, as it is perceived now, seeks to teach these science subjects not in an isolated manner but in an integral way to foster creativity and develop real-life problem solving skills in students. This approach encourages the students to think critically while solving a real-life problem and to understand how these subjects work together to produce a worthwhile practical outcome. To make education more comprehensive and holistic STEM is now replaced by STEAM with the inclusion of Arts in STEM. Apart from modern technical skills, STEAM education aims at imparting critical thinking, innovative skills, research aptitude, and ethics in the students, which would enable them to face the challenges in the future job market as well as in society. The importance of STEM education cannot be over emphasised for the continuation of India's economic growth in the coming decades. India produces around 30 lakhs graduates annually in STEM subjects and equipping them for the future job market and social challenges is of paramount importance for our country. This article would attempt to discuss the details of STEM/STEAM education, how it aligns with NEP 2020, the efforts that have been made by the Indian Government and various private organisations in implementing STEAM based education, and the challenges that are to be overcome for implementation of STEAM education throughout the entire country.

Introduction: the urgent need to change our approach to education

It is universally agreed that Education plays the most crucial role in empowering people to become economically independent, to achieve full potential as a human being, contribute to the society meaningfully, and in ensuring our future growth which is aptly reflected in the statement of Catherine Russell, Executive Director of UNICEF: "The trajectory of our education systems is the trajectory of our future. Low levels of learning today mean less opportunity tomorrow." It is also clear that globally we are surely heading towards a future where economics is going to be more and more dependent on technology. So, good quality education with an emphasis on technical education is of primary importance for any country especially for highly populous developing countries like India.

However, technology has advanced in an unprecedented rate in the last few decades and before we could fully realise the digital technology has become an integral part of our everyday lives. Advances in technology has impacted everything, especially the world of work. The job sectors are emerging and then disappearing, making often today's desired and hard-earned skills of no or little value tomorrow. Employment is becoming fluid and people are moving from one profession to several others in their working life. The future global market would demand innovation skill rather than the service skill since technology and automation would slowly make service sector redundant and the economy would make a transition from service-based economy to innovation based economy.

These rapid changes in the world of work has left a gap between the knowledge generated by the conventional education system and the skills demanded by the employers and the job market and this gap is widening each day. This has put a huge demand on our education system to change and become flexible in a way that matches the requirements of tomorrow.

STEM/STEAM Education, what it is: STEM is the acronym for Science, Technology, Engineering, and Mathematics. Transforming our education system to meet the requirements of the emerging new global world where economics is dominated by technology that is itself fast evolving, would certainly require, among other things, a

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priority focus on STEM subjects: Science, Technology, Engineering, and Mathematics (STEM). The education system of most countries including India have long since prioritized learning of STEM subjects. However, in many countries including India the education has put too much emphasis on theory and rote learning. Also, the STEM subjects are taught mostly separately which fails to equip students in handling real-life issues where success often depend upon application of knowledge from multiple STEM subjects. The conventional education have thus resulted in producing a workforce that is skilled more for the service sector than for sectors needing innovation and critical thinking skills. So, it has become urgent to change this approach to a new one that fosters innovation and critical thinking skills. The modern STEM education approach is about teaching these science subjects not in an isolated manner but in an integral way through solving real-life problems that require knowledge of multiple STEM subjects. This is a project mode hands-on learning which involves working in small groups. This would foster creativity, real-life problem solving, and collaborative skills in students. The approach is student-centric, encourages the students to think critically while solving a real-life problem and helps them to understand how these subjects work together to produce a worthwhile practical outcome.

However, the narrow focus of STEM on the future job market's possible requirements makes it a less comprehensive model for education. Education must lead to holistic development of a person and an entirely STEM-centric educational system would ignore a good number of critical components of human development. All future developments should have an ethical basis and ethical decisions need to be guided by empathy, understanding of literature, history and philosophy. The global issues such as global warming, AI ethics, etc. need a humanistic understanding of the society that requires a thorough knowledge of Arts subject. Also, Arts subjects kindle imagination, abstract reasoning, and emotional intelligence apart from helping develop complex communication skills. Also, true innovations often require the ability to connect apparently unrelated ideas across different domains. Thus the inclusion/integration of Arts (that includes visual arts, music and drama) is equally necessary since future careers will rely heavily upon the so called 21st century skills- critical thinking, problem solving using mathematics and offering technological solutions, collaboration, creativity, cultural awareness and power of expression; Arts would help to foster creativity and power of expression. Inclusion of Arts transforms STEM education into STEAM education that aspires to arm today's learners with the necessary skills of tomorrow in this fast technology-induced rapidly changing world. A good number of pioneering research and scholarly review articles have been published which help provide the foundation of STEAM education and how it is implemented in practice. Some of these are listed in references 1 to 5.

As such all the subjects in STEAM are also taught in the conventional education. But unlike in the conventional education which is predominantly theory based with a focus on remembering facts, formulas, definitions, etc. (the rote learning), STEAM would focus on problem solving and collaboration using interdisciplinary approach that help developing critical thinking, innovation, and the ability to work in a group. STEAM is a project based interdisciplinary approach integrating Arts to STEM to solve real-world problems. The curriculum of STEAM education would combine Science, Technology, Engineering, Mathematics, Languages, Visual Arts and Music with optimum weightages and the teachers would act as facilitators guiding students who work collaboratively on projects. Creativity, problem solving using multidisciplinary approach, collaboration and empathy would be skills emphasised and the evaluation would be based primarily on that. STEAM would not eliminate exams completely but these will have much lesser weightage as compared to that in the conventional education system.

The integration of STEAM subjects in the classroom makes learning much more enjoyable, challenging, and effective. This approach encourages the students to think critically while solving a real-life problem and to understand how these subjects work together to produce a worthwhile practical outcome. The integration of Arts that include visual arts, music and drama with STEM, helps to develop a skill set that is more innovative. The STEAM education prepares the students to respond smartly to today's rapidly changing world where technology would sooner than later replace repetitive tasks. It prepares them for life in the 21st Century irrespective of the career they choose.

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There are many already a number of sites (a few are listed in References 6 to 9) available in the internet that contain typical examples of well thought STEM based projects for the elementary, middle, and high school. For example one of STEAM projects at the elementary level could be to design and construct a water filtration system consisting of plastic bottles, sand, gravel and filters. Through this project the students learn earth sciences, a bit of chemistry, and how to experimentally measure the flow rate. Another example could be a geometric origami project that needs the students to fold paper into intricate 3D shapes, blending there by art and mathematics. Once students are trained in this manner they will develop a love for learning and interest will grow in them to think of innovative projects that has some applications in real-life. This makes the study an interesting and absorbing challenge rather than a punishment requiring to memorise a never-ending set of different types of information.

In the subsequent sections we would discuss the Indian perspective (how important is it for us to implement STEAM education), the efforts that have been made by the Indian Government as well as private organisations towards implementing STEAM education, and the challenges that are need to be overcome for implementing STEAM education country-wide.

STEAM Education and the Indian Perspective: As it is mentioned already India produces about 30 lakhs graduates in science and engineering subjects. India's STEM workforce constitute at present about 30% of the global talent pool but only a small percentage of these students about join research in core research areas like physics, material science, and biotechnology. This is because these graduates come out of an education system that primarily anchors on rote learning. Presently, a major fraction of students goes to the IT service sector and software engineering. But competitiveness in the future global market would require innovation skill rather than the service skill since technology and automation would slowly make service sector by and large redundant.

Research is also the key and perhaps the only way to achieving the Strategic Autonomy, which aims at reducing import dependence of semiconductors and other critical materials, strategic arms including missiles, and energy production. Emerging technologies like AI, Quantum Computing, and Green Hydrogen also requires a large number of motivated and capable researchers. Also, India is a very young country. Thus a failure to impart the skills necessary for the future world would lead to huge unemployment in the country in the coming decades. This would obviously create multiple social problems and disturb our social fabric in a major way. So, from Indian viewpoint major changes in the educational policy shifting the focus from theory based rote learning to innovation based learning and from teacher-centric to student-centric learning needs the most urgent attention.

STEM Education and the Indian efforts: Reacting to these demands, India has formulated the National Educational Policy 2020 ((NEP2020) (Ref. 10) with the aim to transform teaching of subjects from the rote learning mode to a dynamic problem solving mode requiring critical thinking skills. The emphasis is on practical project-based learning that is interdisciplinary in nature (as opposed to mostly theoretical learning of each individual subject separately in the existing education system) to develop innovation and critical thinking skills in the learners. The projects at various levels in schools are to be chosen so that the execution of those involves application of knowledge of multiple STEM subjects and often an Art subject. STEAM has five key objectives as envisaged in NEP2020: to develop critical thinking, creativity, communication, collaboration and character. Robotics, AI and Coding are to be introduced as early as in Grade 6. The foundational mathematical concepts are to be taught as early as early as at the age of 6 years using games and puzzles. By the 8^{th} standard students are to be exposed to vocational crafts to build real-world capabilities. In Indian context, a major issue is the "Leaky Pipeline": Women although constitute 43% of STEM graduates only about $1/3^{rd}$ of them join the workforce. This is a huge loss to our investment in education of STEM subjects. NEP 2020 has a special emphasis to promote STEM for girls to remove the gender disparities in the field of science and technology.

For higher education, NEP 2020 seeks to promote interdisciplinary education allowing science and engineering students to choose humanities courses (say, for example allowing a student to choose Physics and Music). NEP 2020 puts special emphasis on research by the way of equipping the institutes of higher learning with technology

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development centres and research facilities in frontier areas like biotechnology, AI, material science, renewable energy production etc.

As a part of NEP 2020 mandate, the Indian Government has taken a lot of measures to promote STEM education by way of creating various facilities. These initiatives include:

a) Atal Tinkering Labs (ATLs), pushed aggressively by NITI Aayog's Atal Innovation Mission. Under this mission thousands of schools are to be equipped with laboratories having robotics, AI, 3D printing, Internet of Things (IoT). ATLs makes these topics an integral part of the curriculum and ensure students get hands-on experiences so that critical thinking and innovative skills develop in them.
b) Skill India & CBSE Skill Modules: CBSE has included and embedded in their curriculum AI, coding and computational thinking.
c) Digital Learning Platforms: This is another initiative by the Government by way of launching SWAYAM and I-STEM portal. These offer open access modules, skill-building, and R&D support for students and teachers.
d) Digital STEM Rollout: Government has launched the Samagra Shiksha Scheme aiming to convert classrooms at the secondary level into digital STEM labs which will make high quality science and mathematics resources available to students.
e) Rashtriya Avishkar Abhiyan (RAA): RAA focuses on promoting hands on STEM activities at rural and backward India.

Private Sector involvement in STEM education: The involvement of Indian Private Sector in STEM education is significant and many companies and NGOs are working together to set up labs to close the skill gap. Their involvement is primarily driven by corporate social responsibility and public-private partnership. The major organisations are:

a) India Stem Foundation (Ref. 11): The main objective of this organisation is to make STEM education accessible to all. The programs they follow are CSIR powered and they focus on providing STEM facilities to underserved schools and students across India. They provide schools with practical learning tools, help in setting up infrastructure/hands-on STEM labs, teacher training, and a platform for global robotics competitions (World Robot Olympiad, WRO) and the First LEGO League (FLL). They also provide Certified Teacher Training Programs and Structured Educational Programs to close the gap between the theoretical and practical knowledge of engineering.
b) CRY (Child Rights and You) STEM Foundation (Ref. 12): CRY India also focusses on providing STEM education to underprivileged and rural sectors. It sets up Mini Science Centres/labs in schools to facilitate hands-on learning and to impart practical knowledge to students. They also run dedicated community programs to encourage girls to pursue STEM carriers.
c) Companies like Google, Infosys, WIPRO, IBM, and TCS contribute in specific areas (code to learn, science labs, providing scholarships, data science, high quality STEM materials, etc.)

Challenges to overcome for STEAM Education: It is obvious that STEM / STEAM approach to education doesn't constitute a mere shift or improvement over the present educational system that anchors predominantly on rote learning but requires an almost revolutionary change in our education system. The implementation of STEM/STEAM based education constitute huge challenges and requires working of a solid roadmap that includes: new curriculum, new evaluation methods, well trained teachers, and huge investments from the government as well as from the private organisations; keeping in mind simultaneously that education shouldn't be entirely for the future job market and should also boost fundamental research that will in turn shape our future as well as the job market. It should also prepare us to solve the future social issues and global problems with empathy that would ensure the survival and progress of human race.

There a number of major barriers to be crossed for implementing STEAM Education throughout the country. These include:

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a) Infrastructure and digital divide between the major cities and the rural areas. Schools in rural areas often lack basic infrastructure that include high speed internet connection, enough computers, uninterrupted power, and lack of hardware and software support.
b) Outdated Curricula and Pedagogy: Traditional Institutions still want to rely upon rote learning and many teachers are reluctant to embrace the new student-centric and problem solving mode pedagogy. It is also a tremendous task to draw curricula based on modern STEM education needs and implement it throughout the country. That education is both a Centre as well as State subject as per our constitution, one definitely apprehends problem in implementation of a uniform strategy and curriculum for STEAM education throughout the country.
c) Gender Disparities: Female students even after completing science education often don't join the workforce in engineering, technology and scientific research. This is referred to as the "leaky pipe line".
d) Severe shortage of trained educators: STEM teachers need to be highly proficient in computer use and digital pedagogy, innovative to help students in executing the STEM projects and appreciate the need for multidisciplinary learning. Presently, there is a huge dearth of such teachers in India.
e) Huge investment: Implementing STEM Education throughout India requires huge investment on the part of Government and from the Private Sector.

Conclusions

India produces a huge number of STEM graduates each year and enabling them suitably through STEAM based education represents a huge prospect for our economy and the country. A failure to implement STEAM education successfully and quickly enough would affect adversely our country's future growth and sovereignty. However, successful and effective implementation of STEAM based education needs almost a revolutionary change in our existing education system and in our age-old perception of what education is. The Indian government has already made considerable efforts in terms of formulating NEP 2020 and initiating projects to build STEAM-friendly labs and facilities in schools. The corporate sector and also NGOs are also responding enthusiastically to this need and started contributing significantly to STEM/STEAM education. The successful implementation of STEAM Education throughout our vast and highly populated country is truly an extremely challenging task but for our country's future we need to plan meticulously and work hard hand in hand to make it a reality within a decade or so.

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INTEGRATION OF INDIAN KNOWLEDGE SYSTEMS INTO STEM EDUCATION: A MULTIDISCIPLINARY APPROACH TO SUSTAINABLE LEARNING

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Abstract: The Indian knowledge system refers to the long-established body of knowledge developed in our country and transmitted for years, across generations through texts, oral tradition and lived experiences too. The integration of Indian Knowledge Systems into STEM (Science, Technology, and Engineering & Mathematics) education offers a transformative approach to learning by connecting traditional wisdom with modern scientific inquiry. This study examines the relevance of indigenous Indian contributions in Science, Technology, Engineering and Mathematical practices within contemporary STEM curricula. It highlights how combining IKS into this study course can promote interdisciplinary understanding, and which will be followed by critical thinking, ethical awareness, and sustainable problem-solving among students. The amalgamation of activity-based learning and cultural learning with science methods which is prevailed in IKS-based STEM education can help students understand India's rich intellectual traditions. This education also helps students solve comprehensive problems. The study mainly looks at adding knowledge to today's school curricula and that this inclusion does not only make learning more interesting but also encourages synthesis. In short, the focus is on making education more engaging and effective. It aims to prepare students for the challenges of today and tomorrow and IKS-based STEM education is key, to achieving this goal.

Introduction

Education is really important for individuals and societies because it helps people learn things and understand different cultures. In today's world STEM education, which includes Science, Technology, Engineering and Mathematics is a part of how we make new discoveries and grow our economy. Sometimes STEM education focuses too much on technical stuff and not enough on things, like culture, values and traditional wisdom. This is where Indian Knowledge Systems or IKS come in. IKS is a way of combining wisdom with new scientific ideas. It is helping us learn more about science, technology, medicine, math, literature and philosophy. Indian Knowledge Systems is a way to bring traditional knowledge into STEM education. By doing this we can make learning more interesting and meaningful. IKS is contributing a lot to fields, including science, technology, medicine, mathematics, literature and philosophy according to Mandavkar (2023).

Indian Knowledge Systems is a collection of knowledge that people in India have developed over many years. This knowledge has come from people watching things trying things out thinking deeply about things and using things in a way. India has a lot of ideas and discoveries in areas like mathematics, astronomy, medicine and environmental science. Long back, Indian scholars did some really important work that we still use today to think about science. They came up with the idea of zero and the decimal number system, which was a deal. They also made progress in algebra and geometry. Some famous Indian scholars, like Aryabhata and Varahamihira studied the stars and planets. The idea of zero and the decimal system was one of the contributions that India made. This idea started in India around the century and it changed the way we think about numbers. Indian Knowledge Systems is the foundation of numerical systems. There are some books, like the Charaka Samhita, Bhela-Saṃhitā and Sushruta Samhita that talk about how to make people healthy how to stop people from getting sick and how to use natural things to heal people. These old books show that Indian Knowledge Systems has been thinking about science and new ideas for a long time. Indian Knowledge Systems has been a part of India, for a time.

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Modern education often keeps learning separate from the things we see and experience in our daily lives like our local traditions and cultural identity. This creates a gap. We need to change the way we educate people so that we can include knowledge that's relevant to our culture in the things we learn in school. Including Indian Knowledge Systems, in science and math education can help students connect with India's traditions again. It can also make learning more interesting and related to our lives.

The National Education Policy (NEP) 2020 is highly inclined towards combining Indian Knowledge System (IKS) with Science, Technology, Engineering and Mathematics (STEM) education. This will help create a learning environment that is not just about technical skills, but also about culture and overall growth. The policy wants schools and colleges to teach about India's achievements in science, math, arts, medicine, building design, and taking care of the environment. By doing these students will learn about India's heritage that follows development of important skills like creative thinking and critical thinking. The NEP 2020 stressed on the fact that education should make students aware of ethics and help them understand and respect culture. The Indian Knowledge System (IKS) being a part of this will give students a chance to learn from the country's history and traditions. The goal is to create an education system that mixes technical learning with cultural and historical knowledge.

STEM Education is a way to help students understand science and math better. It does this by getting them involved in engineering and technology. This is something that William talked about in 2011. IKS-based STEM education is about learning by doing and using what you learn. In the past people in India learned by watching nature trying things out and working together. If we use these methods in schools today students will find learning fun. Combining Indian knowledge with STEM Education helps students feel good about who they are and where they come from. Students who learn about the science that came from India may feel proud to be Indian. This can help people see that science is not something that happened in Western countries alone and help students understand that knowledge comes from different places and cultures. This way of thinking can help make education fairer by recognizing that there are ways of knowing things. It acknowledges the contributions of different cultures and minds. STEM Education can really benefit from this approach. By learning about STEM Education and its connection, to knowledge students can gain a deeper understanding of the subject. The integration of Indigenous Knowledge Systems into science and math education is really important for the future of our planet and for ideas. A lot of Indian ways of living are all about keeping the earth healthy and using resources in a way that is good for everyone. Things like farming methods, natural medicine and ways of building houses can teach us a lot about how to deal with the big environmental problems we are facing today. For example, collecting rainwater is a way of managing water that is still really important today because many places do not have enough water.

Indigenous Knowledge Systems like growing trees and crops help keep the soil healthy and full of life and this is a better way of farming than some modern methods. By learning about these ways and comparing those to modern science students can come up with new and sustainable solutions to big global problems, like climate change running out of resources and health issues that affect a lot of people. Indigenous Knowledge Systems and science can work together to make the world a better place.

Now, incorporating IKS in STEM education brings about a plethora of interdisciplinary approach however with some conditions. One major challenge is the lack of a structured curriculum frameworks, teaching materials, and trained educators capable of effectively combining traditional and modern knowledge systems. This is needed to be ensured that indigenous knowledge is presented scientifically and critically rather than romantically or uncritically. It should be a must-condition for the Education based institutions to adopt corroboration-based approaches that evaluate traditional knowledge while maintaining academic rigor and scientific standards. In addition, curriculum developers and policymakers need to design inclusive educational models that respect both traditional wisdom and contemporary scientific advancements.

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Review of Literature

Kapse et al. (2026) examined the feasibility of integrating Indian Knowledge Systems (IKS) into modern engineering education through the analysis of curriculum, conducting interviews of the faculty members, and student surveys. Their study figured out limited institutional implementation although there had been policy support and proposed a Five-Layer Pedagogical Framework to integrate indigenous knowledge into STEM education, enhancing ethical awareness, cultural relevance, and innovation in engineering learning. Jain and Agrawal (2025) analyzed the role of Indian Knowledge System in modern STEM education. Their study throw light on the contributions of Ayurveda, Vedic mathematics, sustainable technologies, and environmental practices in enhancing creativity, computational thinking, and holistic problem-solving. The authors focused on the integration of IKS through multidisciplinary and experiential learning, supported by National Education Policy (NEP) 2020, to promote culturally rooted, innovative, and sustainable educational practices. Pragati and Kalyani (2026) explored the integration of ancient Indian wisdom with STEM education through a multidisciplinary approach. The study highlighted the role of Indian philosophy, aesthetics, spirituality, and traditional pedagogies in elevating creativity, environmental harmony, and holistic learning. It stressed on integrating oral traditions, Vedic teaching methods, and mathematical practices into contemporary way of study to address contemporary educational and societal challenges. Homavazir and Homavazi (2024) examined the role of India's National Education Policy (NEP) 2020 in fotifying STEM education. The authors highlighted that quality and inclusive education is essential for national growth and global competitiveness. Their study discussed how NEP 2020 replaces the National Education Policy of 1986 that which promoted scientific, technological, engineering, and mathematical learning through systematic implementation, aiming to develop human resources for the benefit of individuals, society, and the nation. Puri (2025) depicted that the Indian Knowledge System (IKS) offers a holistic framework covering disciplines such as philosophy, mathematics, medicine, governance, arts, and architecture. The study emphasized that integrating IKS into undergraduate education can promote critical thinking, ethical values, sustainability, and cultural identity. Focused on the role of the National Education Policy 2020, the paper inspects institutional initiatives and argues that incorporating indigenous knowledge traditions can significantly enrich contemporary higher education and strengthen students' intellectual and national consciousness. Singh (2024) found out that STEM education in Indian higher education institutions is influenced by the National Education Policy 2020 and the growing global demand for STEM professionals. The study highlights improvements in STEM enrollment, curriculum innovation, research, and creative pedagogy. However, challenges such as high costs, academic pressure, social biases, and gaps between school and higher education persist. The author recommends stronger industry collaboration, inclusive practices, better infrastructure, and integrated STEM learning to prepare students for future global opportunities. The study by Chen and Wu (2024) highlights how Indigenous cultures have long practiced sustainability, unlike modern Western society where such values are declining. The authors propose integrating STEM education with Indigenous knowledge, especially in disaster prevention for children. Using NGSS standards, cultural curriculum models, and a five-stage learning cycle, the study develops a sustainability-focused Indigenous teaching framework that blends traditional wisdom with modern educational approaches. Abbasi (2024) examined the integration of the Indian Knowledge System (IKS) into teacher education in line with the National Education Policy (NEP) 2020 and University Grants Commission (UGC) guidelines. The study highlighted that incorporating Indian Knowledge Systems through curriculum reforms, interdisciplinary teaching, cultural values, and teacher training can create inclusive and all-emcompassing learning environments while strengthening cultural awareness and improving the quality of teacher education in India. Ogunniyi and Iwuanyanwu (2024) explored STEM teachers' perspectives on integration of Indian Knowledge Systems (IKS) into multidisciplinary STEM education for sustainability of learning. Their study found that dialogic argumentation workshops helped teachers develop more positive attitudes toward IKS, recognizing its role in promoting sustainability and reflective reasoning. The authors concluded that integrating IKS can strengthen STEM teacher education and support innovative approaches to solving complex environmental and social challenges.

Objectives of the Study

- To explore the concept of integrating Indian Knowledge Systems into STEM Education.

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- To analyze the role of IKS in enhancing STEM learning and critical thinking.
- To identify challenges and opportunities in integrating IKS with STEMK Education.

Research Questions

- How can Indian Knowledge System be integrated into STEM Education to promote holistic and interdisciplinary learning?
- What role does Indian Knowledge Systems play in enhancing STEM learning outcomes, critical thinking, and problem-solving skills among learners?
- What are the major challenges and opportunities in integrating IKS with contemporary STEM Education?

Methodology: A qualitative method has been chosen for the study, which involves a review of related studies and deep analysis of the same.

Analysis & Interpretation

Integration of IKS into STEM education for the promotion of holistic and interdisciplinary learning: The Indian Knowledge Systems can be a way to teach STEM subjects in a way that is connected to our culture. India has a lot of ideas and discoveries that can help students learn about science, math, technology and the environment in a more meaningful way. STEM subjects can be taught by combining Indian ideas with modern science concepts. This way of teaching can help students learn in a complete and hands-on way. For example, during a mathematics the discussion about how Indian mathematicians like Aryabhata came up with the concept of zero and decimal notation can help students understand the history and culture behind the math they are learning. Similarly, in science class the principles of Ayurveda to learn about plants that can be used for medicine, biodiversity and how to stay healthy. According to Akoijam Pete Meitei & Chingtham Naobema Dev (2021), combining IKS with various subjects such as science, social studies, and art enriches the learning experience. By working on projects that combine science, technology, ethics and traditional Indian practices, students can learn to think, be creative and understand the importance of taking care of the environment. This way of learning can help students appreciate the Indian Knowledge Systems and learn in a complete and interdisciplinary way.

Role of IKS in enhancing STEM learning outcomes, critical thinking and problem-solving skills among learners: Indian Knowledge Systems can really make a difference in how we learn about Science and Technology and Mathematics. Traditional Indian contributions in mathematics, astronomy, medicine, metallurgy, agriculture, and architecture provide learners with historical and practical perspectives that enrich STEM education. For example, the mathematical works of Aryabhata and Brahmagupta help students understand numerical reasoning and algebraic thinking, while Ayurvedic principles encourage systems thinking and interdisciplinary inquiry. The study of classical systems like Vedic Mathematics and ancient texts by scholars such as Pingala, actually the binary numbers and Aryabhata's trigonometry and astronomy trains students in mental agility, pattern recognition, and computational thinking. Again, if this side can be focused- the ancient's Panchadi system focuses on observation, reflection, and experiential learning pedagogy (a five-step integrated learning approach) focuses on observation, reflection, and experiential learning. Rather than accepting rote truths, this challenges students to investigate the '*how'* and '*why'* behind phenomena, promoting a rational and analytical mindset. In this context, Joseph (2011) found that, the invention of the concept of zero, attributed to Indian mathematician Aryabhata, revolutionized mathematics and is considered one of the greatest innovations in human history.

The major challenges and opportunities in integrating IKS with contemporary STEM education: Integrating Indian Knowledge Systems with the things we inculcate is crucial and there is a huge need for that but implementing the same is not that easy. The main role who is responsible for the integration is the mentors, the teachers. They are needed to be trained enough how to assimilate the old golden practices with the contemporary teaching methods. Much of the academic institutions lack faculty members who are well-versed in IKS, resulting in insufficient

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knowledge to teach these subjects effectively or to incorporate them into existing curricula. This expertise gap can lead to a narrow understanding of IKS, which diminishes its perceived value in educational settings (Kumar, 2018). Again, proper infrastructure for STEM is very crucial and for the integrating teaching practice which will be even more to compare or suggest example but it lacks in maximum cases. Institutional resistance is also not a lesser problem. Many educational institutions operate within established frameworks that prioritize Western epistemologies, often viewing IKS as peripheral or less rigorous compared to conventional disciplines (Rudra, 2015). Many educational institutions feel comfort and operate within established frameworks that prioritize West, often viewing IKS as peripheral or less rigorous compared to conventional disciplines (Rudra, 2015). Moreover, IKS is vast, diverse, and intensely localized. The lack of standardized assessment frameworks and structured academic resources makes uniform integration difficult at the state or national level.

Educational Implications

Integrating the Indian Knowledge System into STEM education enriches modern course of study with historical context, removing the colonization in learning thus, helping in retaining the environmental balance. The blend of ancient prudence with modern science, education shifts from rote learning to hands on learning which fosters the long-term cognitive retention and a sustainable outlook. There are several areas where IKS contributes to the STEM field. Some of them are mentioned below:

Holistic & Multidisciplinary Understanding: Holistic and multidisciplinary understanding is very important. Integrating Indigenous Knowledge Systems or IKS helps break down barriers between subjects. For example IKS includes things like Vedic Mathematics, which helps people think better and do math in their heads. It also includes ways of working with metal or farming which combine chemistry, biology and economics in a very useful way.

Experiential and Contextual Learning: Experiential and contextual learning is another part of IKS. This means that of just memorizing things students get to learn by doing. They go out. Observe the world around them and get to interact with their local environment.

Shift in Educator Role: The role of teachers is also changing. Their work are not limited to giving out information anymore. Now they are like guides and coaches. They help students connect ideas and principles with new scientific discoveries and principles. Indigenous Knowledge Systems or IKS is playing a role, in this change. IKS is helping students learn in a hands-on and interactive way.

Enhanced Knowledge Retention: When we teach things in a way that makes sense to people in their own community they remember the science and technical areas better. This is because it is connected to their life. Studies show that when we use real life examples from the community people are able to recall the principles for a long time. This is what happens when we ground concepts in the local culture and use information, from real community surveys to teach science.

Conclusion

Integrating Indian Knowledge Systems (IKS) into STEM education offers a transformative approach to teaching and learning by connecting India's rich intellectual heritage with contemporary scientific knowledge. Such integration promotes holistic, interdisciplinary, and culturally relevant education, enabling learners to understand scientific concepts through indigenous perspectives and real-world contexts. Traditional contributions in mathematics and astronomy and medicine and agriculture and architecture and sustainability are really helpful for making STEM classes more interesting and for helping people think critically and be creative and come up with new ideas. In alignment with the goals of the National Education Policy (NEP) 2020, the integration of IKS into STEM education can contribute to the development of scientifically skilled, socially responsible, and culturally grounded citizens.

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Thus, IKS serves as a valuable foundation for fostering innovation, sustainability, and lifelong learning in the twenty-first century.

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COMMUNITY BASED LEARNING IN HILL REGION STUDENTS

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Abstract: Community-based learning (CBL) is an educational approach that connects academic learning with community engagement, local knowledge, and experiential activities. In hill regions, where geographical isolation, cultural diversity, ecological sensitivity, and limited infrastructure strongly influence educational experiences, CBL provides a context-sensitive and inclusive model of education. Conventional education systems often fail to address the realities of hill communities, leading to student disengagement and cultural alienation. This study examines the concept, significance, theoretical foundations, models, challenges, and implementation strategies of community-based learning among hill region students. Drawing upon experiential learning, constructivist, sociocultural, and critical pedagogy theories, the chapter highlights how CBL integrates indigenous knowledge, environmental practices, and community participation into formal education. It emphasizes the role of CBL in promoting cultural preservation, environmental awareness, student engagement, social responsibility, and stronger school-community relationships. The discussion also explores major challenges such as limited resources, curriculum rigidity, teacher preparedness, language barriers, and geographic isolation. Furthermore, the study suggests strategies including curriculum localization, multilingual education, teacher training, technology integration, and school-community partnerships to strengthen CBL practices. Case examples from India, Nepal, and Bhutan demonstrate the practical relevance of community-based learning in mountainous regions. The chapter concludes that community-based learning offers a transformative framework for creating meaningful, equitable, and sustainable education for hill region students while preserving local culture and supporting community development.

Introduction

Community-based learning (CBL) is an educational approach that integrates academic learning with community engagement, local knowledge systems, and experiential participation. In hill regions, where geographical isolation, cultural diversity, ecological sensitivity, and limited infrastructural access significantly shape educational experiences, community-based learning becomes especially relevant. Hill region students often belong to indigenous, tribal, or culturally distinct communities whose traditional knowledge, livelihood practices, and social systems provide rich educational resources. Conventional classroom-centered education frequently fails to acknowledge these contextual realities, resulting in disengagement, cultural alienation, and reduced educational effectiveness. Community-based learning offers an alternative framework by connecting formal education with local culture, environmental practices, community participation, and experiential learning opportunities. This chapter examines the concept, significance, pedagogical foundations, challenges, and implementation strategies of community-based learning among hill region students. It also discusses policy implications and practical recommendations for strengthening context-sensitive education in mountainous regions.

Concept of Community-Based Learning

Community-based learning refers to an educational process in which students learn through active participation in community activities and local problem-solving initiatives. It combines academic instruction with practical engagement, enabling students to connect theoretical knowledge with lived experiences. The approach is rooted in constructivist and experiential learning theories, emphasizing that learning occurs most effectively when students actively interact with their social and cultural environments.

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Community-based learning involves several key elements

- Integration of local knowledge into curriculum.
- Participation of community members in educational processes.
- Experiential and participatory learning methods.
- Collaborative problem-solving.
- Development of social responsibility and civic engagement.
- For hill region students, CBL recognizes the value of indigenous ecological knowledge, local agricultural systems, oral traditions, handicrafts, traditional medicine, and community governance structures.

Educational Context of Hill Regions

- Hill regions across countries such as India, Nepal, Bhutan, Peru, and Ethiopia share common educational challenges:
- Difficult terrain and poor transportation.
- Inadequate school infrastructure.
- Teacher shortages and high absenteeism.
- Linguistic and cultural diversity.
- Limited access to technology and educational resources.
- Economic dependency on agriculture and forest-based livelihoods.
- In many hill communities, children contribute to household labour, seasonal farming, livestock care, and collection of forest products. Standardized curricula designed for urban populations often fail to reflect these realities. Consequently, students may perceive schooling as disconnected from their lives and future aspirations. Community-based learning addresses this disconnect by making education relevant to local contexts and community needs.

Theoretical Foundations of Community-Based Learning

1. **Experiential Learning Theory:** David Kolb proposed that learning occurs through concrete experiences, reflective observation, conceptualization, and active experimentation. Hill region students benefit from experiential learning because their environments naturally provide opportunities for observation and practical engagement in agriculture, ecology, and community activities.
2. **Constructivist Theory:** Constructivist theorists argue that learners construct knowledge through interaction with their environment and social experiences. Community-based learning aligns with constructivism by allowing students to engage with local realities and collaboratively generate understanding.
3. **Sociocultural Theory:** Lev Vygotsky emphasized the role of culture and social interaction in learning. In hill communities, elders, artisans, farmers, and local leaders become important educational contributors who transmit cultural knowledge and social values.
4. **Critical Pedagogy:** Paulo Freire advocated for education that empowers marginalized communities through dialogue and participation. Community-based learning promotes educational equity by validating local identities and encouraging students to address community challenges.

Importance of Community-Based Learning in Hill Regions

1. **Cultural Preservation:** Hill communities often possess unique languages, folklore, music, rituals, and indigenous knowledge systems. Mainstream education may unintentionally marginalize these traditions. Community-based learning helps preserve cultural heritage by incorporating local history, oral narratives, and traditional practices into educational activities. For example, students may document folk songs, traditional agricultural methods, or medicinal plant knowledge as part of school projects.

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2. **Environmental Awareness:** Hill ecosystems are ecologically fragile and highly vulnerable to deforestation, soil erosion, landslides, and climate change. Community-based learning enables students to develop environmental stewardship through direct engagement with local ecological issues.

3. **Students can participate in:**
- Watershed conservation projects.
- Forest management initiatives.
- Biodiversity documentation.
- Sustainable farming practices.
- Such activities cultivate ecological literacy and environmental responsibility.

4. **Increased Student Engagement:** Students are more motivated when learning reflects their lived experiences and cultural realities. Contextualized education reduces feelings of alienation and promotes meaningful participation.

5. **Practical and community-oriented activities enhance:**
- Attendance.
- Classroom participation.
- Retention rates.
- Problem-solving skills.

6. **Development of Social Responsibility:** Community-based learning encourages students to contribute to local development. Through collaborative projects, students develop empathy, leadership, communication skills, and civic responsibility. Examples include: Health awareness campaigns, Waste management initiatives, Community surveys, Disaster preparedness programs

7. **Bridging School and Community:** Traditional education systems often separate schools from community life. Community-based learning strengthens relationships between teachers, parents, local organizations, and community leaders, creating a supportive educational ecosystem.

Models of Community-Based Learning in Hill Regions

1. **Place-Based Education:** Place-based education uses local geography, ecology, culture, and history as the foundation for teaching. In hill regions, this approach may involve studying mountain ecosystems, local biodiversity, or traditional farming systems.
2. **Service Learning:** Service learning combines academic instruction with community service. Students identify community needs and participate in activities that address local challenges while reflecting on their learning experiences. For instance, students may organize: Literacy programs, Reforestation drives, Health camps, Water conservation projects.
3. **Indigenous Knowledge Integration:** Many hill communities possess rich indigenous knowledge systems related to agriculture, weather forecasting, medicinal plants, and natural resource management. Community-based learning validates and incorporates these knowledge traditions into formal education.
4. **Participatory Action Research:** Students investigate local problems collaboratively and propose practical solutions. Topics may include: Water scarcity, Migration, Soil erosion, Waste disposal, Sustainable tourism, this approach develops critical thinking and research skills.

Role of Teachers in Community-Based Learning:

Teachers play a central role in implementing community-based learning. Their responsibilities include:
- Facilitating experiential learning activities.
- Encouraging community participation.

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- Adapting curriculum to local contexts.
- Promoting inclusive classroom practices.
- Guiding reflective learning processes.
- Teachers in hill regions require specialized training to effectively integrate local knowledge and participatory methods into teaching.

Community Participation in Education:

Community participation is essential for successful CBL implementation. Parents, elders, artisans, farmers, and local organizations contribute valuable knowledge and resources. Community involvement may include: Sharing indigenous practices, participating in school management, assisting with field-based projects, supporting local curriculum development, such collaboration strengthens educational relevance and social cohesion.

Challenges of Community-Based Learning in Hill Regions

Despite its benefits, community-based learning faces several challenges.

1. **Limited Resources:** Many hill schools lack: Teaching materials, Transportation facilities, Technological infrastructure, financial support, these limitations restrict field-based activities and community projects.
2. **Curriculum Rigidity:** Standardized national curricula often prioritize examination-oriented learning, leaving limited flexibility for contextualized education.
3. **Teacher Preparedness:** Teachers may not receive adequate training in participatory pedagogy, local curriculum adaptation, or indigenous knowledge integration.
4. **Language Barriers:** Students in hill regions may speak local dialects or tribal languages different from the medium of instruction. This linguistic gap can hinder participation and comprehension.
5. **Geographic Isolation:** Remote settlements and difficult terrain create logistical challenges for community engagement activities.
6. **Policy Constraints:** Educational policies may emphasize uniformity and centralized assessment systems rather than localized learning approaches.

Strategies for Strengthening Community-Based Learning

1. **Curriculum Localization:** Educational authorities should allow flexibility for integrating local content into school curricula. Topics related to local ecology, history, culture, and livelihoods should be incorporated.
2. **Teacher Training Programs:** Pre-service and in-service teacher education programs should include: Participatory pedagogy, Experiential learning methods, Indigenous knowledge systems, Community engagement strategies.
3. **Multilingual Education:** Using local languages alongside national languages enhances comprehension and cultural inclusion.
4. **School-Community Partnerships:** Collaboration among schools, local governments, non-governmental organizations, and community groups can strengthen resource mobilization and project implementation.
5. **Use of Local Knowledge Resources:** Schools should document and utilize community expertise in agriculture, crafts, medicine, environmental conservation, and oral traditions.
6. **Technology Integration:** Digital tools can support community-based projects through: Documentation of local knowledge, Virtual collaboration, Environmental monitoring, Distance learning support.

Case Examples of Community-Based Learning

1. **Himalayan Regions of India:** In several Himalayan communities, schools have integrated environmental conservation projects into curricula. Students participate in forest conservation, watershed management, and biodiversity documentation activities.

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2. **Nepal:** Community schools in Nepal have incorporated local agricultural knowledge and cultural practices into educational programs, improving community participation and student engagement.
3. **Bhutan:** Bhutan's educational philosophy emphasizes holistic learning, environmental sustainability, and cultural preservation, aligning closely with community-based learning principles.

Policy Implications

Governments and educational planners should recognize community-based learning as an essential strategy for equitable and inclusive education in hill regions. Policy priorities should include:

- Decentralized curriculum development.
- Funding for experiential learning programs.
- Teacher capacity-building initiatives.
- Support for multilingual education.
- Inclusion of indigenous knowledge systems.
- Community participation frameworks.
- Policies should balance national educational standards with local contextual relevance.

Conclusion

Community-based learning provides a transformative educational framework for hill region students by connecting formal education with local culture, environmental realities, and community life. It promotes contextualized learning, cultural preservation, environmental awareness, and social responsibility. By integrating indigenous knowledge and experiential learning into educational practices, community-based learning enhances student engagement and educational relevance. However, successful implementation requires supportive policies, teacher training, curriculum flexibility, and strong school-community partnerships. In the context of growing concerns about educational inequality, cultural erosion, and environmental sustainability, community-based learning represents a powerful approach for creating inclusive and meaningful education in hill regions.

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WISDOM MEETS PRACTICE: ALIGNING STUDY HABITS WITH INDIAN KNOWLEDGE SYSTEMS IN NEP 2020

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Abstract: This chapter discusses the potential of Indian Knowledge Systems (IKS) to revolutionize the approach to learning for students in today's time in accordance with NEP 2020. From the philosophical and educational philosophies of Indian thought-from the tradition of the Guru-Shishya Parampara to the learning philosophies of Shravan, Manan, and Nididhyasana, from the multidisciplinary approaches of Yoga, Vedic Mathematics, and Ayurveda wellness-the chapter highlights that while there is undoubtedly a problem with the curriculum, the technologies employed, or even the teaching methodologies involved in modern education today, the real problem lies in a complete misalignment of attitude and philosophy of the learners. Today's learners have been exposed to far too much information than any previous generation, yet they lack the wisdom to learn, live, or interact with knowledge. NEP 2020's call for holistic, multidisciplinary, and IKS-driven education makes up an interesting proposition for addressing this challenge. This chapter presents the SPANDA Framework and draws conclusions based on the same.

Introduction

There is something subtly strange about today's Indian student. She carries with her a smartphone that has access to almost everything there is to know about humankind. Before she even gets out of bed, she can access a lecture by a Nobel prize winner, tutorials on Quantum Mechanics, or the entire works of Adi Shankaracharya. Yet, when she sits down to learn, she finds herself distracted, unmotivated, and overwhelmed. She highlights the pages but does not read the content. She learns on YouTube while browsing Facebook, and studies till 2 a.m., fueled by fear and caffeine, just to forget everything after a week.

This is not the tale of a struggling student. This is the tale of an education system that, for years, has confused the provision of information with education itself. And what we now have is a generation of learners who are incredibly well-informed yet under-educated-in the truest sense of that phrase. They know facts; they do not know how to be wise. They can give answers; they do not know how to ask the question.

NEP 2020 presents itself as an important corrective move. Among the various components included in it, one component which deserves special mention is the promotion of Indian Knowledge Systems. To some teachers, IKS is nothing less than a revival of the golden era of teaching and learning-a mine full of disciplined, holistic, and contemplative learning experiences waiting to be unearthed once more. For some, however, the idea evokes feelings of unease regarding uncritical romanticism, involvement in religion, and the danger of compromising scientific discipline altogether. Both views are exaggerated, in my opinion. In this chapter, I attempt to chart a balanced course that promotes the adoption of IKS principles through humanly sensitive means.

This chapter will be organized as follows. First, it will provide an exploratory look at what exactly Indian Knowledge Systems mean in terms of teaching and learning. Then, it will discuss how NEP 2020 creates opportunities but also poses requirements to incorporate IKS into learning. Finally, it will analyze how the principles of IKS can change learning habits and the challenges it can pose along with what a possible framework for learning based on IKS may entail.

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Conceptual Foundations

Indian Knowledge Systems, it must be acknowledged, is a broad term. Under it fall knowledge systems as diverse as Vedic mathematics, Ayurveda, Yoga philosophy, Nyaya, Natya Shastra, Vastu, ecology and other environmental sciences known to Indians since time immemorial, indigenous forms of oral education practiced by Indian tribes. What links them all? Not an ideology or a religion, but rather an epistemology - a system whereby knowledge cannot be reduced solely to a proposition or information. In the knowledge systems we discuss here, knowledge is transformational.

This can hardly be better explained than by Shanwal (2025). IKS sees knowledge not as fragmented, but as connected. The ancient Gurukul never taught its students facts about any particular field in 50-minute lessons. It taught them through life itself, which included studying, contemplating, disciplining their body, moral growth, and engagement in work for the community. Thus, what resulted from this teaching method were not academic qualifications, but dispositions.

The following three teachings from this tradition can be of particular significance to our discussion of student behaviors. First, there is Shravan-Manan-Nididhyasana - gradual movement from attentive listening to profound thinking and then contemplative assimilation. This is not just an educational technique. Rather, it is a conception of the mechanism by which the human mind acquires knowledge. Second, there is Svadhyaya (or self-study), meaning disciplined practice of self-examination based on constant interaction with ideas expressed through books. Third, there is consideration of Kala (time). It implies respect for inherent rhythms of studying process, awareness of non-uniformity of mental activity, and acceptance of these rhythms as an integral part of any wisdom.

According to Kandwal & Negi (2024), these teachings are not just cultural artifacts. In fact, they bear great practical relevance to how students actually study, organize themselves, respond to difficulties, and remain motivated throughout the entire learning process. Now, the question arises as to how we can make them alive again and apply in our modern classroom environment.

Study Habits: A Critical Analysis of the Current Paradigm

There has been an abundance of study of study habits in contemporary educational psychology. Spaced repetition trumps massed practice, as do active retrieval and the interrogation of meaning in elaborative questioning, all findings of which we have been aware for many years. As Das and Chatterjee (2025) point out, overlearning, spacing, active assignment work, revision, and recitation are all important components of good study habits.

Something essential is, however, absent from all the current Western paradigms of study. The popular paradigm of self-regulation proposed by Zimmerman is highly cognitive and motivational but gives no thought to the internal world of the learner. Self-regulation focuses on goal-setting, monitoring, and adaptation of strategies-all of which are crucial-while posing no questions about how the act of studying can be made a sacred activity, how students' sense of purpose-their Sankalpa-influences their learning, or the importance of silence in the process.

It is not for lack of humility, but because of a certain linguistic limitation within a materialist and individualist culture that has characterized much of cognitive science research up to now, that these questions have never been asked before. IKS provides the language to formulate such questions. The challenge of NEP 2020 is to enable an authentic dialogue between the two cultures.

NEP 2020 and the IKS mandate

In many ways, NEP 2020 is the most philosophical education policy ever formulated in India. This policy unequivocally rejects the highly examination-centered and rote-learning-based nature of schooling in India and aims

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at promoting education that would be holistic, flexible, multidisciplinary, and learner-centered. Most importantly from the perspective of the present chapter, NEP 2020 mandates the inclusion of Indian Knowledge Systems into the education process at all levels-as not an additional component but a pedagogical approach per se.

The provisions contained in NEP 2020 are indeed empowering. The focus of this policy on mother tongue as a medium of instruction makes possible the promotion of indigenous knowledge systems that always used to develop in vernacular language. The accent on learning by experience corresponds with the IKS principle of "learning by doing". Holistic development advocated by NEP 2020 covers physical, affective, ethical, and intellectual growth-all these correspond to the holistic view of a human being according to IKS tradition.

However, Kumar and Verma (2024) provide further insight into the discussion by exploring assessment changes brought about by NEP 2020. They contend that introducing continuous and comprehensive assessment may enhance studying practices by fostering a routine studying approach rather than encouraging last-minute cramming. The introduction of semester system in combination with portfolio-based assessment (e.g., the proposed automatic portfolio assessment described by Panda et al., 2026) may create conditions conducive to continuous studying as opposed to mechanical learning.

It should be pointed out, however, that the implementation of the new policy has certain limitations which need to be discussed. For instance, according to Shanwal (2025), there is no standard curriculum of IKS, the training of instructors in IKS-related pedagogical approaches is not sufficiently widespread, and the documentation of indigenous knowledge remains incomplete. In addition, there is a lingering concern in academia about the legitimacy of including IKS as a subject into the curriculum: some doubt whether it is a topic worthy of scientific research or simply a nostalgic exercise. Such reservations cannot be ignored.

How IKS Approaches Can Help Reform Study Techniques

Reforming one's approach to studying based on IKS does not simply entail switching from one technique to another. Rather, it requires adopting a new attitude about learning. The following represents five ways that approaches informed by IKS, when deliberately adopted, can influence not only how students' study, but who they are as learners.

From Passive Receptive Learning to Active Contemplation

Passive re-reading of highlighted sections, simply running eyes over the text in the hope that some of the knowledge would get through, is still the most common strategy of study in Indian classrooms. The IKS approach of Manan, or deep contemplation about what one has learned, is quite different from the conventional way of studying. This form of learning is not passive. It is an act of intellectual debate and criticism with regard to ideas: playing with ideas, challenging the ideas against one's experience and finding out what lies beyond the ideas.
Manan, when practiced by students, can be translated into a task which involves reading and then shutting the book and writing down for ten minutes, questioning one's own learning. For example, questions such as: 'What didn't I understand?', 'What surprised me?' and 'What do I find difficult to accept?' would all be relevant. This technique is fully compatible with modern research in cognitive sciences.

Learning In Tune with the Clock, Not Against It

IKS's view of Kala-time as a dynamic rhythm, rather than an empty vessel, can affect study schedules. Traditional Indian scriptures, like modern neuroscientific research, indicate that people have different cognitive capabilities throughout the day. The Brahma Muhurta, which is the 90-minute period before sunrise, is believed to be the time when people can achieve better comprehension and receptiveness. Modern research has shown that people generally have improved working memory skills and better knowledge consolidation during the morning.

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The concept of Kala-time is also reflected in the belief that rest itself is learning. In other words, nididhyasana, which is the third part of the process of Shravan-Manan-Nididhyasana, implies that the assimilation of knowledge involves digestion-like process when knowledge gets absorbed at subconscious levels.

Purpose as the Basis of Motivation

A key problem faced by modern Indian students lies in the area of motivation. They do not study out of any love for learning; rather, they are motivated to do well in their exams due to the threat of penalties imposed on them or because earning a degree is financially essential. Thus, the resulting mode of motivation is an extrinsic one, where studying is either for reward or to avoid punishment, lacking an inner drive to keep students motivated once the outside forces stop motivating them.

IKS provides a unique model of motivation based on Sankalpa, which means intention or commitment, and Purusharthas, the four goals of human life. According to Kandwal & Negi (2024), linking learning to both Dharma and Artha can turn this activity into a profession. A student with a sense of the purpose of her education will approach her studies differently. Not only would she have a better attitude to her academic pursuits, but she would also be able to resist distractions and avoid procrastination.

The Body as a Tool for Learning

While the western tradition of education in general has largely ignored the importance of the body in intellectual learning-a separate entity that should be seated in a chair while the mind works-IKS has never doubted the embodiment of knowledge. Yogic philosophy, in its classical form, does not prescribe exercise; it offers a way to integrate the body, breath, and mind-a process without which there can be no meaningful and sustained learning experience.

By engaging in five minutes of pranayama before starting work, one is not wasting precious moments but creating conditions in which effective learning can take place. As Yadav (2025) mentions, screen fatigue and digital anxiety are real challenges to learning. Practices like yoga, pranayama, and even mindful movements help manage neurophysiological factors such as cortisol release and nervous system regulation to ensure optimal focus on a task.

Dialogue and Debate as Methods of Learning

Dialogue has been intrinsic to the Indian practice of learning since ancient times. In the famous dialogues between Indian philosophers, the focus was more on epistemology-the act of challenging and debating to gain knowledge. In today's time, the ancient tradition of Shastrartha finds an echo in the Socratic seminars, peer teaching, and problem solving.

In the context of NEP 2020, Das and Chatterjee (2025) mention peer collaboration and communication as critical aspects of the proposed improvement in study habits. However, the tradition of IKS implies that true learning requires the challenge and stimulation provided by dialogues. Without such dialogue, the learner's understanding suffers due to a lack of diversity. It would be wrong to think that integrating IKS into NEP 2020 would be a piece of cake. As mentioned in the literature review above, there are five challenges identified consistently across the sources. And these should be taken seriously.

Teacher preparation poses the first challenge to integrating IKS into NEP 2020

According to Shanwal (2025), there can be no integration of IKS in higher education without the development of faculty members; otherwise, such a step remains a policy objective but does not materialize in teaching-learning

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processes. The second barrier is curriculum overload. The current curriculum in India is already challenging for undergraduate students, and incorporating IKS into it without any changes can simply cause more burden.

The third barrier, which seems to be very pertinent in this age of technology, is the issue of distraction. In the study conducted by Sharma (2026), it was discovered that students who were dependent on their smartphones had less study hours per day, poor working memory, and poor attention management capacity. The meditative practice recommended by IKS needs a focused mind.

Fourth, there is the danger of romanticization. All of the Indian education system's traditions have not been enlightened. While the Gurukul tradition had great wisdom about how to teach, it also involved exclusion of certain castes from being educated. The true integration of IKS into today's schools and colleges should be critically selective, embracing the good aspects but rejecting those which were unjust. Fifth, there is the problem of mismatching assessment criteria. While students may study using reflective methods, they still have to pass exams based on quick memorization. As long as the exam systems remain the same, there will always be incentives to study via rote memorization.

Nonetheless, several enablers do exist. First of all, NEP 2020 offers legitimate policy room which did not exist before. Growing global interest in the mindfulness and contemplative approach can create cultural readiness to implement IKS traditions in education. Finally, digital tools – if used wisely, as Yadav (2025) states – can provide students access to IKS material which they could otherwise not see.

And there is also, within Indian students themselves, an undercurrent of craving for deeper meaning: for comprehension not only of their subject matter but of its purpose, and of themselves in the process of acquiring that knowledge.

The SPANDA Framework: A Practical Way Forward with IKS-Led Study

The SPANDA Framework is offered as a practical, actionable structure which allows us to take concrete steps in incorporating the ideas behind IKS in our learning practices. Spanda, in Sanskrit, means vibration, pulse, or creative energy-a beautiful word that describes so well the concept of the act of learning as vibrant, energetic, alive. This model takes shape in six pillars, all of them based on IKS practices and all compatible with modern findings from the learning sciences.

The first such pillar is that of Silence and Centering, based on the concepts of Pratyahara (withdrawing the senses) and meditation. This would mean beginning each study session by taking two to five minutes of silence-no phones, no music, no noise. Simply allowing the brain to settle before any work commences. Studies of attention have shown us how much easier it is to focus and switch tasks when we start with pre-task centering.

The next pillar is Purpose Setting, which comes from the concept of Sankalpa in IKS. Before starting a study session, the student should ask himself questions such as what he aims to learn in this session and what the importance of that topic is. This approach is not intended as a method of measuring performance. This is a means of directing his attention towards a more conscious learning experience. The third pillar is Active Reflection, which comes from the Manan concept in IKS. After studying or attending lectures, students are encouraged to write a few words about what he has understood, what he did not understand, and what he wishes to discover.

The next pillar is the concept of Narrative Learning, coming from the oral traditions of Indian pedagogy. It is easier to grasp complex information when they are presented in the context of stories. That is what Indian scholars used as well to explain many different concepts with the help of literature such as the Puranas, the Panchatantra, and the Jataka Tales. Lastly, the concept of Dialogue and Debate, known as Shastrartha in India.

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The sixth and final pillar in the framework is that of Assimilation and Rest, based on the principle of Nididhyasana and the Yogic practice of Yoga Nidra. Assimilation and Rest, according to this framework, take into account the truth that rest does not necessarily mean lack of learning but, rather, constitutes an essential component of the learning process itself. Enough sleep, breaks, and deliberate restful reflection sessions are all critical prerequisites of deep learning.

Finally, it is essential to note that SPANDA is not a protocol for following the six pillars but, rather, a set of orientations from which different individuals will benefit in different ways and from which different disciplines will derive varying importance of each of the six elements. For example, a mathematician may find more productive use of the Dialogue and Debate pillar, while a literary student may benefit more from the Narrative Learning pillar.

Discussion

Underlying the practical concerns of this chapter there is another issue which needs to be stated outright. It is the question of purpose. The colonial legacy of education left behind the goal of creating Indians in blood and colour who were thoroughly Anglicized in intellectual sensibility. This goal was accomplished in more ways than one too effectively. Higher education in India after independence has been modeled on Western academic institutions – their citation practices, disciplinary divisions, examination structures, narrow definition of achievement.

The NEP 2020, despite the difficulties inherent in implementation, is a bold step towards addressing this question anew. It indicates that perhaps Indian education should seek to utilize the rich heritage of its civilization, not as some sort of return to pre-modern forms, but as a contribution to the modern age. The Indian Knowledge System traditions covered in this chapter do not constitute quaint relics from the past. On the contrary, they are examples of a deeply human and highly developed approach to education and the formation of knowledge.

The literature reviewed above clearly and unambiguously reinforces this argument. Kandwal and Negi (2024) indicate how IKS may enhance ethical leadership and reflective practice. Furthermore, Das and Chatterjee (2025) highlight the connection between holistic learning and improvements in study practices and academic success. Moreover, Shanwal (2025) presents the diversity of resources that can be leveraged through the use of IKS for curriculum enhancement purposes. Therefore, it appears that a simple solution to improving study practices in India involves not just more effective methods and technologies but a deeper narrative about the essence of education itself.

Conclusion

Let us go back to the student discussed at the beginning of this chapter-the girl with her smartphone, her scattered mind, and her late-night anxieties in preparation for examinations. She is not the issue; she is a victim of a system which, for many years, has asked her to learn in ways entirely opposite to how a person's brain works. She has been told to memorise without comprehending, to achieve without purpose, to compete without meaning.

What IKS can offer her-and what NEP 2020 hopes to give at its best level-is a totally different proposition. It asks her to study in the manner in which her tradition has always educated, with intention, with thought, with her body and breathing involved, with her community as support and her sleep as her partner rather than as an indulgence. It asks her to comprehend that education is not something that happens to her during examinations but something that happens inside her through her entire life because of what she learned about loving learning.
This SPANDA framework is an offering towards such an end.

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INDIAN KNOWLEDGE SYSTEM AS A PATHWAY TO HOLISTIC EDUCATION IN THE ERA OF NEP 2020

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Abstract: The Indian Knowledge System (IKS) is a treasure trove of wisdom that can shape the minds of students. It has gained renewed significance in contemporary educational discourse, especially in relation to holistic learning under NEP 2020. This study explores how IKS can contribute to the intellectual, emotional, moral and spiritual development of learners. It adopts a qualitative and conceptual review approach and draws on secondary sources such as journal articles, policy documents and scholarly writings on IKS, holistic education and NEP 2020. The analysis identifies recurring themes in the literature, examines how the policy framework positions IKS in education and considers its relevance to classroom practices such as experiential learning, reflective pedagogy and value-based assessments. The review suggests that IKS can enrich modern education by connecting knowledge with values, culture and lived experience. Simultaneously, it highlights challenges such as limited teacher preparation, epistemological resistance and the risk of superficial implementation. The study concludes that IKS should be viewed as a complementary framework rather than a substitute for modern knowledge systems, so that it can support a more balanced student-centered model of education aligning itself to the vision of NEP 2020.

Introduction

IKS is a collection of knowledge that has been passed down through generations in India through vivid chronologies. It covers subjects like philosophy, science, medicine and spirituality. IKS is not about books; but it is the way of life that emphasizes the importance of living in harmony with nature and with each other (Pandey, 2024). Traditional Indian educational practices like the Gurukul System, yoga and meditation provide a model for holistic education. In today's context, this approach matters even more because students face stress, mental-health concerns and social fragmentation (Maharana, 2025). NEP 2020 acts as a boon as it creates a room to rethink IKS as a living educational resource rather than bridging things to the past.

Need and Significance of the Study

The Indian education system has often been criticized for placing too much emphasis on examinations while giving less attention to the overall growth of learners. As a result, many students experience stress and undergo disengagement. In this context, IKS offers a meaningful framework for making education more balanced and holistic. It supports learning that connects knowledge with values, reflection and real life understanding which aligns closely with the aims of NEP 2020. Studies by Jacob and Gaur (2024) and Kumar (2025) suggest that IKS can contribute to learner development by encouraging self-awareness, resilience, ethical understanding and a broader sense of purpose. Taken together, these insights show that IKS is relevant not only for preserving cultural traditions but also for improving the quality and depth of education in contemporary India.

Objectives of the Study

a. To examine the role of IKS in promoting holistic education under NEP 2020.
b. To analyze the contribution of IKS to the overall development of learners.
c. To analyze the integration of IKS in the modern educational practices.
d. To explore the challenges and opportunities of integrating IKS into education.

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Methodology: This study follows a qualitative, conceptual review approach based on secondary sources, including peer-reviewed journal articles, policy documents, and related scholarly writing on IKS, holistic education and NEP 2020. The analysis focuses on three steps:

a. Identifying the main ideas used by different authors to define IKS and holistic learning.
b. Examining how NEP 2020 positions IKS within broader educational reform.
c. Mapping IKS based ideas to classroom practices such as experiential learning, reflective teaching and value-based pedagogy (Balchandani, 2026; Jacob and Gaur, 2024; Lawati, 2025).

This method helps synthesize existing scholarship and presents a clear basis for understanding how IKS can contribute to holistic education.

Limitations of the Study

This study is limited to review of secondary sources and does not include primary data from students, teachers or schools. The findings therefore appear interpretive and context-specific rather than empirical and direct classroom evidence. In addition, the discussion is focused on Indian context and NEP 2020, so the conclusions may not fully apply to other education systems.

Results and Discussion

Role of IKS in promoting holistic education: IKS can support holistic education by connecting academic learning with values, reflection and lived experience. Rather than treating knowledge as separate pieces, IKS encourages students to see links between subjects, community and everyday life. This makes learning more meaningful and also supports emotional, moral and spiritual growth alongside intellectual development (Balchandani, 2026; Jacob and Gaur, 2024). In this way, IKS does not replace modern education, but strengthens it by adding depth, context and a stronger sense of purpose (Rout and Sahoo, 2025; Lawati, 2025).

Role of IKS in overall development of learners: IKS supports learner development in a more balanced way because it does not only focus on academic achievement but also encourages intellectual growth through reflection, deeper understanding and emotional growth through practices such as mindfulness and self -control, moral growth through ideas like dharma and non-violence, and spiritual growth through inner awareness and sense of connectedness to life (Balchandani, 2026; Jacob and Gaur, 2024; Rout and Sahoo, 2025). This makes IKS relevant to holistic education because it helps students develop not only knowledge, but also character, empathy and purpose (Lawati, 2025).

Integration of IKS in the modern educational practices: IKS can be integrated into modern education at several levels including curriculum, pedagogy, teacher education and assessment level. At the curriculum level, themes such as ethics, mindfulness and traditional ecological knowledge can be included across subjects. At the pedagogy level, methods such as storytelling, discussion, project work and reflective learning can make classes more engaging and meaningful (Mamgain, 2025). At the teacher education level, training programs can prepare teachers to use IKS ideas in a balanced and practical way. At the assessment level, evaluation can move beyond memory-based tests and include portfolios, journals and presentations that can reflect deeper learning (Balchandani, 2026; Jacob and Gaur, 2024; Lawati, 2025).

Challenges in integrating IKS: Although IKS appears to have a strong potential in education, integrating it into regular classrooms is laden with difficulties. Many schools still follow exam-oriented practices, so there is limited space for value-based and experiential learning. Teachers may also lack enough training, resources or confidence to handle IKS content in a balanced and non-sectarian way. In addition, there is always the risk that IKS may be introduced only at a surface level rather than being meaningfully connected to curriculum and teaching (Balchandani, 2026; Isser et al., 2024).

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Opportunities under NEP 2020: NEP 2020 creates several opportunities for bringing IKS into education in a meaningful way. It focuses on multidisciplinary learning, flexibility and experiential methods to allow traditional knowledge to be connected with modern subjects and classroom practices. It also opens space for projects, digital resources and teacher development that can make IKS more practical and accessible. If proper support gets applied, the policy directions can help turn IKS into a useful part of promoting holistic education rather than a symbolic addition (Parmar, 2026; Isser et al., 2024).

Future research directions

The existing literature shows gaps that future research can address. There is a need for empirical study on how IKS based interventions affect students' emotional and moral development in a classroom-based setting. Regardless that, more work is needed to understand how IKS-based activities like yoga, community service, storytelling and reflective lessons affect the moral, emotional and spiritual growth in students. Comparative studies across different school boards and regions would also help us identify what works best in different contexts. In addition to it, teacher-led action research can provide practical insights into how IKS can be used more effectively in everyday teaching (Jacob and Gaur, 2024; Rana and Jain, 2025).

Conclusion

This paper examined the role of Indian Knowledge System (IKS) in promoting holistic education under NEP 2020. The discussion showed that IKS can support the intellectual, emotional, moral and spiritual growth of learners while making education more meaningful and connected to life (Balchandani, 2026). Although challenges such as teacher preparedness, curriculum overload and limited practical implementation remain. The policy direction of NEP 2020 creates a strong space for IKS to be used as a valuable educational resource. Overall, IKS can strengthen modern education by adding balance, values and deeper sense of purpose (Jacob and Gaur, 2024; Lawati, 2025).

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EXPERIENTIAL LEARNING IN NEP-2020: A SIMPLE WAY TO UNDERSTAND THE IDEA

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Abstract: The NEP-2020 emphasizes the necessity of moving away from memorization toward experiential learning, making it an essential pillar in holistic learning and development. The following chapter presents the concept of experiential learning through its phases of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Some of the main features of experiential learning are activities that involve practical learning, dealing with real-life problems, engaging in cross-curricular learning experiences, and reflection throughout the whole process. Students and teachers become partners in the process of creating new knowledge, where the latter act as facilitators and co-designers of meaningful learning environments. Although there are still difficulties associated with implementing the model, including lack of proper teacher training, assessment methods, facilities, and reluctance toward change in pedagogical methods, experiential learning can be of significant importance in the modern educational landscape due to its ability to develop essential skills for future life and work.

Introduction

Education in the 21st century is moving away from rote memorization and focusing more on student centred learning methods. These methods encourage creativity, critical thinking, teamwork, and problem-solving skills. In India, the implementation of the National Education Policy (NEP) 2020 by the Ministry of Education has created a transformative framework that gives importance to experiential learning. NEP 2020 imagines education as holistic, multidisciplinary, flexible, and rooted in Indian culture and traditions, while also preparing students for global challenges. NEP 2020 acknowledges that conventional approaches in the education sector largely revolve around reading from textbooks and writing examinations, with no scope for creative thinking and hands-on experience. As such, this education reform policy calls for learner centred and activity-based teaching approaches. The Ministry of Education states that pedagogy should be more experiential, holistic, integrated, inquiry driven, discovery oriented, learner centred, discussion based, flexible, and joyful. Critical thinking and problem solving are among the primary objectives of experiential learning in the context of NEP 2020.

Conceptual Understanding of Experiential Learning

Experiential learning is a process through which students gain knowledge, skills, and values through direct experience and thoughtful reflection. This theory became popular through the work of educators such as John Dewey, Kurt Lewin, Jean Piaget, and David Kolb. This approach involves activities such as experiment, project work, field trips, storytelling, role-playing, internship, arts-integrated learning, sports-integrated learning, and vocational training. In experiential learning, learners take part in the learning process actively rather than listening to lectures passively. NEP 2020 places a lot of emphasis on this approach throughout the education system. Experiential learning mainly involves actively interacting with the environment to acquire information, and skills, and comprehend difficult ideas (Lone and Kour, 2024). It promotes practical and personal experiences of individuals, develop new knowledge, skills, values, concepts, and attitudes. In Experiential learning learner get opportunities to learn with self-pace and get authentic knowledge that a relate with their real-life experiences (Singh et al., 2025). In contrast, India has historically given weightage to close ended examinations and textbook-based instruction. The National Education Policy 2020, proposed a paradigm shift towards experiential and skill-based learning approaches for India (Kumar and Sawhney, 2025). NEP 2020 recommends a hands-on experiential learning technique for conceptual and practical

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knowledge, which frequently encourages learners to investigate issues for holistic learning and understanding across all disciplines (interdisciplinary approach) (Sharma and Lajwanti, 2025). The policy aims to transition education from memorization to grasping concepts, fostering creativity, enhancing critical thinking and applying knowledge in practical ways. As a result, experiential learning is viewed as a crucial method for cultivating skilled, self-assured and socially responsible individuals in the 21 st century.

3. Characteristics of Experiential Learning		
1	Learning by doing	Experiential learning involves learning through actions and practical experience rather than from textbooks or lectures. In this case, the learners acquire information through participation in activities, experiments, field trips, role playing, project work, or any other kind of real-life activity. It enables learners to retain knowledge for a long time since it involves the learner experiencing the process of learning.
2	Active participation	As mentioned earlier, learning through experiences entails a lot of activity on the side of the learner. The learner becomes an active participant in classroom discussion, team building, presentations, surveys, practical work among other things. This makes learning interesting, motivating and encourages the learner to take responsibility for his or her own learning.
3	Reflection	It refers to thinking deeply about something one has experienced. Through reflection, learners reflect on what they have learned, the challenges they encountered during the process and ways in which they can improve.
4	Application in real life	Experiential learning involves making connections between education and real life. Students learn how theoretical concepts can be used in daily living, in society, and even in future professions. It enables them to use the acquired knowledge in the right manner. For instance, in learning environmental sciences, students engage in tree plantation exercises.
5	Problem-solving approach	In this teaching approach, the learners are taught problem-solving skills. They have to identify the problems, analyze the situation, and offer a solution to the same. This enhances their decision-making skills. Some of the activities in which learners are engaged include experiments, simulation, case studies, and other group work.
6	Learner-centered approach	Unlike traditional methods, experiential learning is learner-based where the interests of the learners are given priority. The learners' abilities, experiences, learning styles, and interests are taken into account during learning processes. The teacher's role becomes that of a facilitator in guiding learners through the process.
7	Skill and value development	Apart from offering academic knowledge to the learners, experiential learning also helps develop some skills and values in them. These skills include communication, teamwork, leadership, creativity, adaptability, self-confidence, and time management skills.
8	Continuous learning cycle	The learning cycle that characterizes this form of education is continuous. It begins with students gaining an experience, reflecting on it, comprehending the idea, and finally applying the learning in new environments. This continuous process allows learners to continuously enhance their knowledge and skills. It promotes the lifelong learning and personal development of the individual.

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9	Collaborative learning	Collaboration and cooperation characterize experiential learning. This means that students come together, exchange ideas, and assist one another to finish their assignments. It helps learners develop communication skills, interpersonal skills, and social skills. They get used to working with individuals who have diverse perspectives.
10	Holistic learning	Experiential learning fosters holistic development in learners. It develops the intellectual ability of students along with their emotional, social, moral, and practical skills. Learners grow into knowledgeable, responsible, innovative, and socially conscious individuals. The main purpose of experiential learning is to prepare learners not only for exams but also life.

Role of Students and Teachers in the Implementation of Experiential Learning in Education

- **Actively participating in activities:** The learners participate actively in discussions, projects, experiments, field trips, and other forms of practical learning. The learners do not just listen but actively participate in the entire learning process.
- **Self-directed learning:** Self-directedness is one of the aspects that students display in the process of experiential learning. The learners come up with questions, look for information, analyze ideas, and make conclusions based on personal experiences and observations.
- **Reflecting on experiences:** The learners reflect on their activities and experiences to be able to evaluate what they have gained from the experience and how they can improve future performance.
- **Collaborative learning:** Learning in groups is one of the aspects of experiential learning. Group learning involves sharing thoughts, respecting the opinion of others, among others.
- **Life skills development:** With experience learning, learners gain life skills like communication abilities, leadership skills, self-confidence, adaptability, and social responsibility

Role of Teachers in Implementing Experiential Learning in Education

- **Learning facilitator:** Under experience learning, the teacher becomes a facilitator instead of being merely a lecturer. The teacher creates an atmosphere where learning can take place through activities and experiences.
- **Critical thinking and problem solving:** Critical thinking and problem solving are the two important elements that students must use when dealing with real-life situations
- **Giving guidance and support:** The teacher guides and supports the learners while they engage in various activities but does not provide all the necessary information or solutions to learners.
- **Evaluating learning:** Assessment of students' performances is not only limited to examination but also projects, presentation, practical, class participation, and problem solving.
- **Linking learning to reality:** It is the responsibility of teachers to connect classroom knowledge with reality so that its value may be increased.

Challenges in the Implementation of Experiential Learning in Education

1.**Insufficient availability of resources:** There might not be enough availability of laboratories, technology, teaching aids, and funds in many schools and colleges to arrange practical experiential learning activities.
2.**Large number of students in classrooms:** With a larger number of students in a class, it becomes difficult for teachers to pay attention individually or conduct practical lessons in class.
3.**Insufficient training of teachers:** Some teachers do not receive adequate training on how to implement practical teaching techniques in class. As a result, they may fail to conduct experiential learning activities.
4. **Inadequate time:** Activities involved in practical teaching are time-consuming compared to traditional classroom lessons. It is challenging to cover the entire syllabus in limited time through experiential learning activities
5.**Marks-based educational system:** An educational system based on marks and traditional teaching techniques gives less value to practical learning in class.

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6.**Lack of infrastructure facilities:** The infrastructure facilities in rural or underdeveloped schools make it difficult to conduct experiential teaching activities like projects, debates, and discussions.
7.**Assessment difficulty:** The process of assessing the experiential mode of learning is difficult because it encompasses practical skills, participation, creativity, teamwork, and problem-solving, and it cannot be assessed using normal tests and exams.
8.**Inactive student participation**: Students may not be involved in any of the activities related to experiential learning owing to lack of motivation, interest, or knowledge of how this process works.
9.**Lack of funds**: The activities associated with this type of learning need extra financial support, which may not be available in many institutions.
10.**Unequal participation:** There might be an unequal distribution of opportunities to engage in the practice owing to differences among students socially and economically.

6. Significance of Experiential Learning in Present Education System		
1	Accelerates learning:	Rote Learning has been long supplanted by Learning by Doing. The Experiential Learning approach makes use of critical thinking, problem-solving, and decision-making to provide a training module. It has developed into a well-established way of Accelerates Learning.
2	A safe learning environment:	Simulations are an aspect of Experiential Learning and they can even use realistic scenarios that illustrate various challenges that will be encountered by the participant in the future. It is only natural that mistakes are made in the process of learning, but with simulation-based training, the mistake-free environment can be created, similar to going to a playground with children in order for them to learn and play around without hurting themselves.
3	Bridging theory and practice:	With the transition from theoretical lessons to practical doing, the learner receives firsthand experience of how to use knowledge gained before. This becomes a vital step for retention of ideas.
4	Highly effective for retention:	Experiential learning is personal and effective. It is capable of having an influence not only on knowledge and skills but also on feelings and emotions. It surpasses classroom learning and ensures high levels of retention.
5	Facilitates personalized learning:	To facilitate personalized learning, it is important for every program to include three phases in particular assessment phase, teaching and learning strategy phase, and curriculum phase. The experiential learning approach helps to achieve all these objectives and enables personalized learning. It is completely opposite to the traditional approach to learning as it extends the learning process outside the classroom. The participant determines his/her pace of learning, which led to the emergence of flipped classrooms concept
6	Enhances engagement levels:	Due to its high emphasis on teamwork and learning from others, the method helps engage the participant. Additionally, since the learner is actively participating in the problem-solving task, there is high ownership of results.

Conclusion

Experiential learning acknowledges that the learning through experience supports students in formulating and solving problems in different ways in unpredictable situation (Chopra, 2023). According to National Education Policy 2020, experiential learning is essential for transforming Indian education from rote-based learning to competency-based education. It helps students gain practical knowledge, life skills, creativity, and problem-solving abilities, preparing them for higher education, employment, and responsible citizenship The successful implementation of experiential learning depends on the active involvement of both students and teachers. Through students focused encounters that

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underline doing, finding, reflecting, and applying, students improve their relational abilities, support fearlessness, and foster capable critical thinking skills (Sachdeva and Latesh 2023). Students learn through participation, reflection, and practical application, while teachers guide, support, and create meaningful learning experiences. Together, they make education more engaging, effective, and connected to real life. Although experiential learning makes education more practical, engaging, and meaningful, its implementation faces several challenges related to resources, training, infrastructure, assessment, and traditional educational practices. Since the 21st century is a time of learner-centered education and teachers play a supporting role in the educational process overall, experiential learning is the greatest approach for 21st-century learning (Singh et al., 2025). Proper planning, teacher training, institutional support, and policy implementation are necessary to overcome these challenges and make experiential learning successful.

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INDIAN KNOWLEDGE SYSTEM AND NEP 2020: POLICY PERSPECTIVES, IMPLEMENTATION CHALLENGES, AND STRATEGIC PATHWAYS

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Abstract: National Education Policy 2020 (NEP 2020), formulated by the Government of India, represents a landmark decision in defining the education system through its focus on integrating Indian Knowledge Systems into curricula and institutions. This paper looks at the policy approach behind this endeavor, the problems faced during its implementation, and the solutions proposed by scholars and professionals to make the integration effective. Using an extensive analysis of existing scholarly literature on this topic, this paper highlights the intellectual legacy of Indian knowledge systems, discusses structural and attitudinal obstacles in their implementation, and proposes several strategies that include teacher education, technology, community engagement, and innovative assessment techniques as ways to further NEP 2020. From the available literature, the following theme emerges – namely, the gap between strong policy intents and inadequate implementation and practices. In fact, the problem is not one of resources, but rather one of conceptualizing and prioritizing different kinds of knowledge in educational settings. The discussion of Indian case concludes with a consideration of how this project fits into a larger global dialogue on decolonizing education.

Introduction

The act of educating is never an apolitical act. The subjects taught by a nation, the language in which the subjects are taught, and the metrics for evaluating learning all contain biases on whose knowledge matters, which traditions ought to be preserved, and what sort of individual a good education would create. Indian higher education throughout most of the time since independence was premised on certain assumptions that had roots in the colonial past. Western traditions of science and philosophy were considered standards of rigour and modernity while Indian traditions were relegated to being curiosities or superstitions of the past. As pointed out by Swamy (n.d.), the intellectual tradition native to India is generally considered folklore in the dominant discourse in the world of academia, an attitude motivated not by any rigorous analysis but by the old hierarchical structure of colonial knowledge production systems. It is within the National Education Policy 2020 that there have been attempts to bridge this divide. By recognizing and prioritizing Indian Knowledge Systems within the design of curriculum, research, and institution building, it can be seen that NEP 2020 reflects a recognition that India's intellectual legacy cannot be confined to history alone. According to Mandavkar (2023), NEP 2020 rests on five principles of accessibility, equity, quality, affordability, and accountability, and that the incorporation of IKS within education is reflective of all five principles. As per Mandal (2026), there were specific mandates included in the policy regarding the allocation of five percent of credits to IKS courses, establishing centers of research, and incorporating teacher education in these traditions.

The gap between having an elaborate policy document and providing students in classrooms across a country like India with a proper educational experience is significant. Through their mixed methodological study involving fifty institutions, Kumar, Shankar, and Airy (2025) determined that while sixty-eight percent had set up IKS cells, and forty-five percent had introduced dedicated courses, a lack of necessary resources remained a barrier.

The NITI Aayog survey conducted in 2023 indicated that forty-five percent of educational institutions find it difficult to incorporate IKS into the curriculum due to syllabus overload, whereas only twenty-five percent of higher educational institutes have offered any training to their faculties for IKS courses, as reported by Chauhan, Kumari, and Jaiswal (2026).

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This paper provides an evaluation of academic research done in the area of integrating Indian Knowledge Systems under NEP 2020. First, the background and historical context in which such efforts are made will be considered with help from the work of Jejurkar (2025), Dongare (2023), and Mandavkar (2023). Next, the paper will review the current state of affairs by examining relevant policy analysis and empirical research regarding implementation efforts. Afterward, the issue of teacher education and students' experiences will be discussed, as well as strategic implications that can be inferred from scholarly research.

Objectives of the Study

The paper is formulated on the basis of the following research objectives.

1. To explore the policy context within which NEP 2020 envisages integrating Indian Knowledge Systems into Indian education systems.
2. To look into the historical context and relevance of the knowledge traditions in India from which this integration needs to happen.
3. To understand the difficulties encountered in the process of implementing this initiative.
4. To look into the possible solutions through teacher education programs, use of digital technologies, and engaging communities.
5. To collate some strategic recommendations offered by scholars and practitioners for successfully implementing NEP 2020.

Research Questions

This chapter will be structured based on three core questions.

- What does NEP 2020 envision by way of Indian knowledge systems and how far have institutions started realizing it?
- What are the major challenges which stand between such an envisioned future and its implementation in real-life situations?
- According to the existing literature, what are the possible pathways through which these challenges may be addressed and overcome?

Review of Related Literature

There has been a lot written about Indian Knowledge Systems and NEP 2020, partly because of the importance of the policy, but also due to the academic richness of the issues that it has raised. The field includes analyses of the policy from perspectives ranging from policy analysis to educational philosophy to community ethnography to environmental science to mathematics history. Collectively, the field forms a substantial basis for grasping the significance of the challenge involved.

According to Khan and Husain (2025), using a qualitative method to analyze policies, NEP 2020 offers curricular integration with elements such as Vedic mathematics, science, and local art, while major issues include standardization and resource-related challenges. Likewise, Mandal (2026), after conducting an analysis through qualitative and analytical methods, found that NEP 2020 requires 5% credit toward IKS courses, and there are over 32 IKS centers throughout India, but there are differences in states regarding political will, budget, and teacher readiness. In a conceptual study, Baral (2024) found that proper implementation of IKS involves developing curricula, teacher training, research collaboration, and the creation of IKS centers of excellence. Using mixed-method research, which entailed surveys of 50 institutions and interviews of 78 people, Kumar, Shankar, and Airy (2025) discovered that 68% of respondents have developed IKS cells within their institutions, 45% offer IKS courses, and 88% of students feel a strengthened sense of cultural identity, whereas problems include insufficient funding (72%), unavailability of skilled teachers (65%), and infrastructure limitations (58%). Bera (2025) undertook teacher education reforms and observed that UGC's suggestions included establishment of IKS centres, integration in curricula, interdisciplinary teaching-learning activities, faculty development programs, and highlighted that value education must be a compulsory

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component of pre-service teacher education. In the edited book published by Roy (2026), there were various contributions where Ghosal discussed feminism and its history which led to Rig-Vedic gender equality, Bose wrote on the existence of ancient women scholars like Gargi and Maitreyi, Biswas discovered that Dharma was the central theme around which Gurukul education revolved, Roy established yoga through the eightfold path as explained by Patanjali and exposed Panchatantra as the instrument of value education, and Rashul identified the oral traditions of women such as Phawar, Li, Dadaria, and Oppari as a counter-archive of eco-knowledge. Likewise, in the edited book of Yadav et al., (2024), the establishment of the IKS Division in October 2020 was studied and noted that traditional practices, such as organic farming and rainwater harvesting provide sustainable alternatives to contemporary environmental problems. According to Sharma, Awasthi & Soni (2025), the researchers undertook a review-based study and reported that over 90 percent of the schools in cities have included yoga in their curriculum and there has been an increase in enrollment in Ayurvedic courses by 25% in five years, cautioning the negative effects on IKS due to globalization. In another study, Howlader & Sarkar (2025) focused on examining mathematical concepts used in traditional fishing and revealed that traditional fishing societies instinctively use the principle of isoperimetric inequality, proving that a circular shape of the cast nets yields maximum area when perimeter is kept constant. In yet another study, Roy (2025) investigated environmental wisdom from ancient scriptures of India and concluded that the foundations of environmental protection are very strong in Vedas, Puranas, Upanishads, Ramayana, and Mahabharata with the help of the theory of Pancha Bhutas and totemism of Indian tribes. Similarly, Nath (2025), teacher development using IKS shows that NEP 2020 encourages integrating IKS into the curriculum of teacher education programs and mentions innovation in methods like inquiry-based, problem-based, case-based, team-based, self-directed, and gaming learning approaches. Jejurkar (2025), who studied the historical evolution of Indian education during the Vedic, Maurya, Gupta, and Chola eras, concluded that IKS has the capacity to revolutionize education through revitalization of Gurukul systems and emphasis on indigenous knowledge but faced challenges such as unawareness and resistance to change. Pandey (2024), who explored the history of Indian education policy changes from NPE 1968 to NEP 2020, identified unawareness among educators, absence of documented information, reluctance to change, and preference for western ways of knowing as some of the main hurdles in the implementation of IKS. Chauhan et al. (2026), after conducting an extensive literature review, found that 45% of educational institutes had problems implementing IKS because of overloaded syllabus, only 25% had faculty trained to teach IKS subjects, and only 15% students perceived IKS as their future career option.

Non-significant differences were found in terms of awareness ($p = 0.814$), perception ($p = 0.856$), and attitude ($p = 0.231$) among qualifications; however, significant differences were observed regarding its cultural and ethical relevance ($p = 0.001$) and interdisciplinary relevance ($p = 0.015$); hence, Rajput et al. (2025) conclude that increasing education will enable individuals to understand the transdisciplinary nature of IKS. Similarly, Shukla and Sharma (2026) explore IKS as part of environmental education and argue that traditional systems such as the creation of stepwells, crop rotation, vermicompost, and sacred groves provide an environmentally friendly approach while highlighting challenges such as lack of proper training for teachers and assessment criteria. Dongare (2023) analyzes critical policies related to IKS, NCF 2005, and NCF 2023 and highlights that while NCF 2005 focused on "diversity to be managed," NCF 2023 emphasized "civilizational state to be reclaimed"; hence, it recommends tri-axial integration of IKS.

The study by Mandavkar (2023) was quite elaborate where he provided data showing that the formation of the IKS Division in October 2020 had led to the establishment of 32 IKS Centres, 75 research centers, internship opportunities numbering 5200, and the digitization of 1.5 lakh books with reference to the progression from the Gurukul system through Macaulay's Education System to NEP 2020 highlighting the fact that the NEP 2020 is based on five pillars namely Access, Equity, Quality, Affordability, and Accountability where the UGC has set a mandate of allocating 5% credit in the form of IKS courses. The issues found in the literature repeatedly included lack of financial resources, deficiency in qualified teaching staff, absence of proper infrastructure, Western educational systems resistant to IKS incorporation, non-standard pedagogical models, and insufficient documentation of oral traditions while the literature clearly shows that successful integration of IKS results in cultural identity, alternative ways of thinking, ethics, and sustainability goals.

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The Policy Framework and its Institutionalization

According to Khan and Husain (2025), after conducting a qualitative investigation into policy documents and the views of various stakeholders, the vision that underlies the NEP 2020 goes far beyond introducing a handful of ancient subjects in an already existing curriculum. This policy proposes education that equally cares about the intellect, emotions, society, and spirit, and which relies on Vedic mathematics, ancient science, technology, and classical arts to educate children of today. Increasingly emerging interdisciplinary research, digitization, and international reach were found to be some of the contemporary trends in this process, although standardization issues, resource availability problems, resistance to change, inclusivity issues, and global competition were seen as barriers.

However, Mandal (2026), in applying a qualitative and analytical perspective to evaluate interdisciplinary literature and policy documents, explored how the above policy vision has already taken institutional form. He discovered that the initiative of giving five percent credit to courses in IKS as part of NEP 2020 is already being implemented through the creation of more than thirty-two IKS centers across universities in the country, IKS Division as part of AICTE, and internship programs that would serve as institutional tools to promote the implementation of the above policy vision. However, Mandal (2026) pointed out considerable differences among states in political commitment, financial support, and teacher readiness, as well as issues such as the lack of faculty members and teaching aids that hamper policy implementation.

As for Pandey (2024), he provided an overview of Indian educational policies in terms of their historical development from NPE 1968 up to their most recent revision with NEP 2020 as the latest effort to create an equal and indigenous education system in India. Mandavkar (2023) provided an insightful analysis of the IKS Division itself, set up in October 2020 in the Ministry of Education at AICTE, whose vision is to rejuvenate and bring the Indian knowledge tradition into the mainstream of modern times. He revealed that around five thousand two hundred internships relating to Indian knowledge have been provided; more than fifty faculty training programs have been organized, and over eight thousand educational institutions have started including IKS in their curriculum along with the digitization of over one and a half lakh books. Mandavkar (2023) also traced the journey of educational policy from the Gurukul period to Lord Macaulay's introduction of English language teaching in 1835, placing NEP 2020 in the larger historical context of contention over what the Indian education system should serve and respect.

Indian Knowledge and Its Historical and Modern Importance

Much of the material written focuses on demonstrating the intellectual depth that the traditions which NEP 2020 is trying to revive. Jejurkar (2025), for example, described how Indian education went through different stages historically, beginning with the Vedic period between fifteen hundred BCE and five hundred BCE, where Gurukul was followed, followed by the period of Mauryans where famous institutions like Nalanda and Takshashila came into being, followed by the period of Guptas when science, particularly astronomy and mathematics, were flourishing, and the Chola period during which temple education was followed and sea voyages became famous. Jejurkar (2025) pointed out that this proves the dynamism of Indian education through history, and NEP 2020's attempts to revive these traditions are thus an attempt to reclaim intellectual tradition rather than a stepping back from modernity.

Further, Mandavkar (2023) gave flesh and bones to this image by describing what the Gurukul course covered, which included the eighteen Vidyas comprising the four Vedas, four Upavedas like Ayurveda, Dhanurveda, Gandharvaveda, and Shilpaveda, along with Mimamsa, Nyaya, Purana, and Dharmashastra. According to Mandavkar (2023), the instructors in this system were perceived as sages dedicated to knowledge, and education was never seen as a business deal, which is an interesting philosophical outlook on education that contrasts with today's market-based system of higher education.

According to Dongare (2023) based on critical policy discourse analysis of NEP 2020, Curriculum and Credit Framework by UGC, and NCF 2023, Indian historiography has been influenced by the intellectual bias of colonizers as reflected in James Mill's characterization of Indian traditions as non-historical. Dongare recommended the formation

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of a tri-axial approach to include Indian empiricism in the form of metallurgical skills of Vishwakarma people, geometrical mathematics of Sulba sutra and Kerala School of Astronomy, and the concept of republic in the Gana Sangha, thus placing the initiative of India along with the Kaupapa Maori initiative in New Zealand and Indigenization in Canada within global pluriversal modernity. Howlader & Sarkar (2025) found out that traditional fishermen use isoperimetric inequality in the design of their circular fishing nets to cover maximum area for a given perimeter, with objects displaying geometric shapes such as cones, cylinders, rectangles, and triangles.

According to Roy (2025), Vedas, Puranas, Upanishads, Ramayana, and Mahabharata have strong eco themes structured on the basis of Pancha Bhutas (five elements), while recording totemism among Ho, Mundas, Santhals, Adi, and Kamar tribes as conservation mechanisms. Shukla & Sharma (2026) studied the traditional systems for management of water resources like stepwells, surangams, khalis, and tanks as well as sustainable agriculture techniques like crop rotation, vermicompost (Jeevamrutham), natural pest management through herbs, and Vrikshayurveda, showing that sacred groves, van panchayats, and seed preservation practices reflect a belief system about humans being a part of nature with direct implications for environmental education. In this regard, the study by Yadav, Deepika, Kumari & Satsangi (2024) is also noteworthy.

Teacher Education and Value Integration

According to Baral (2024), while providing a conceptual analysis of IKS integration strategies, comprehensive curricular designing, effective teacher training, collaborative research, and creative use of resources were critical, especially given that any implementation of these IKS strategies required informed and competent teachers for success. Bera (2025) conducted an investigation into the recent teacher education reforms proposed under NEP 2020, which indicated that UGC had made several recommendations including the establishment of IKS centers, incorporation of IKS in curricula, multidisciplinary approaches, and collaborations with traditional knowledge experts. The author stressed the point that according to Indian philosophies of education, values were caught rather than taught and that teachers needed to exemplify them in order to be successful educators. Nath (2025) analyzed several pedagogical practices consistent with IKS principles and found that inquiry-based learning, problem-based learning, case-based learning, team-based learning, self-directed learning, and game-based learning were some of the practices congruent with the active, experience-based, and socialized Gurukul tradition.

Shukla & Sharma (2026) looked into the issue of assessment, stating that the current evaluation model aimed at memorizing information is inadequate for IKS, suggesting that portfolio assessment, reflection, practical demonstrations, and continuous formative assessment be used instead, as otherwise, the effort to integrate IKS would become yet another exercise in memorizing facts.

Student Experience and Attitudes

An empirical study carried out by Rajput et al. (2025) through a survey distributed to 150 individuals who were students of colleges located in Rajasthan found that basic awareness ($p=0.814$), perception ($p=0.856$), and attitude ($p=0.231$) regarding IKS were similar among both undergraduate and postgraduate students; however, when looking at cultural/ethical relevance ($p=0.001$) and interdisciplinarity ($p=0.015$) of IKS, there were notable differences, meaning that postgraduates appreciate the cultural and ethical sides of Indian knowledge better than undergraduates do. The researchers Kumar, Shankar, and Airy (2025), in their mixed methodological research using a survey of 50 institutions and an interview with 78 stakeholders, revealed that 88% of the students who participated in the active implementation of the IKS curriculum felt strengthened in their cultural identity, thus contributing to the objective set by NEP 2020 to educate the country's citizens on the basis of its culture. As Sharma, Awasthi, and Soni (2025) stated, at present, more than 90% of the urban educational institutions use yoga in their curricula; moreover, the number of students studying ayurveda increased by 25% within five years. However, globalization threatens the development of IKS due to the commercialization of knowledge.

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Challenges to Implementation

According to Khan and Husain (2025), implementation challenges arise from structural issues, attitudes, and pedagogy, such that any solution to them becomes inadequate owing to their interactions. Kumar et al. (2025) reported that 72% of institutions experience the challenge of inadequate funding, while 65% cite a lack of appropriately qualified teachers and 58% cite deficiencies in infrastructure as the major challenges. According to Chauhan, Kumari, and Jaiswal (2026), only 25% of institutions offering higher education have the appropriate faculty for teaching IKS courses, while Mandal (2026) cites variations between the states on political will, financing, and preparedness of teachers. Resource limitation and quality assurance become some of the challenges highlighted by Badlakkanavar and Mali (n.d.). Khan and Husain (2025) highlight challenges related to resistance emanating from the colonial system of education in which western knowledge was regarded as universal and scientific and Indian knowledge as particular and pre-scientific. This situation leads to the coloniality of Indian historical consciousness (Dongare, 2023). According to Chauhan et al. (2026), the other major challenge is employability, since only 15% of students consider a career in IKS viable.

The use of western knowledge systems was highlighted by Pandey (2024) and Dei (n.d.) in educators' and administrators' behavior. Further, Jejurkar (2025) indicated resistance to change and a need for standardization as important barriers. In terms of the digital divide, according to Das (2025), access to digitized knowledge resources poses ethical issues because of the problem with intellectual property rights of indigenous communities. Swamy (n.d.) highlighted that when knowledge is taken out of the community context, issues regarding the beneficiaries of formalization and changes in its nature arise. Khan and Husain (2025) stressed the need for standardization as the central challenge. Furthermore, according to Swamy (n.d.), modern universities with lecture-based curricula fail to teach knowledge that is relational and contextually based. Nath (2025) pointed out that language might be a barrier due to the fact that indigenous knowledge sources are often written in Sanskrit or regional languages rather than English. Bera (2025) stressed that knowledge transfer requires instructors formed in such cultures rather than those whose education consisted only of courses in the area.

Strategic Pathways

Chauhan, Kumari, and Jaiswal (2026) suggested a thematic inclusion of Indian knowledge in the existing disciplines rather than in separate electives. According to Swamy (n.d.), curricular change was required to include indigenous histories, languages, arts, sciences, and philosophies as the core contents of courses. Baral (2024) highlighted the need to ensure that materials are engaging and suitable for learners' ages. Shukla and Sharma (2026) advocated for schools to create herb gardens, rainwater harvesting systems, and compost pits to create a more hands-on learning environment. According to Badlakkanavar and Mali (n.d.), curriculum development should involve collaboration between educators, academics, and traditional knowledge holders. Mandavkar (2023) reported over 50 faculty development programs offered by the IKS Division. Bera (2025) advocated for value education using indigenous knowledge to become compulsory in pre-service teacher preparation. Chauhan, Kumari, and Jaiswal (2026) suggested appointing special faculty members, interdisciplinary research, and bridge programs between academia and practitioners. Shukla and Sharma (2026) advised for IKS training to be compulsory in both pre-service and in-service education. Pandey (2024) suggested faculty training workshops and interactive learning sessions.

Community partnerships involving elders, farmers, and craftsmen teaching as guest teachers was another suggestion by Shukla and Sharma (2026). The use of IKS hubs and museums as learning sites was one of Jejurkar's (2025) suggestions. Public awareness through community activities, cultural festivals, and media campaigns was recommended by Badlakkanavar and Mali (n.d.). The use of platforms such as DIKSHA and SWAYAM as ways of educating students across the country was brought forth by Das (2025). Jejurkar (2025) suggested mobile apps and online learning platforms. Digital repositories to be created in consultation with knowledge-holding communities were emphasized by Chauhan et al. (2026). Addressing the digital divide so that rural communities can have access to digital resources was one of the recommendations made by Das (2025). The number of interdisciplinary research centers in areas such as ancient metallurgy, town planning, water management, and Rasayanshastra stood at 75 according to

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Mandavkar (2023). Interdisciplinary research and innovation centers were recommended by Chauhan et al. (2026) with focus on IKS. Dongare (2023) presented India's initiative in the light of the Kaupapa Māori movement and indigenization in Canada within the context of pluriverse modernity.

Discussion and Conclusion

Jejurkar (2025), Dongare (2023), and Roy (2025, 2026) identified a heritage of exceptional intellectual profundity whose contributions to the fields of mathematics, medicine, ecology, philosophy, politics, and the arts have been profound. Mandavkar (2023) and Mandal (2026) identified the existence of policy commitment underpinned by institutional mechanisms, dedicated centers, digitization initiatives, and mandatory curriculum reforms which represented a break from past colonial legacy. Kumar, Shankar, and Airy (2025), Chauhan, Kumari, and Jaiswal (2026), and Khan and Husain (2025) continuously showed that the gulf separating policy and practice remained wide due to decades of policies designed around Western systems of knowledge. Baral (2024), Bera (2025), and Nath (2025) highlighted the importance of teachers, while Kumar, Shankar, and Airy (2025) revealed that 88% of students in IKS programs felt improved sense of cultural identity. According to Dongare (2023), Swamy (n.d.), and Khan & Husain (2025), addressing the belief in the universality of Western scholarly norms involves an epistemic reckoning. According to Jejurkar (2025), and Chauhan, Kumari & Jaiswal (2026), integration of IKS represents the most ambitious initiative since independence. Dongare (2023) posited that whose knowledge counts was a pertinent question for all societies. According to Mandal (2026), and Mandavkar (2023), there are serious indications in terms of the policy framework, as well as growth in institutional infrastructure. According to Kumar, Shankar & Airy (2025), there were successful cases when students had encountered IKS with enthusiasm. According to Rajput et al. (2025), engaging effectively improves cultural identity, whereas according to Shukla & Sharma (2026), contributions have been made towards sustainability, while according to Baral (2024), efforts are worthwhile.

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EXPLORING HOLISTIC DEVELOPMENT THROUGH MULTIDISCIPLINARY EDUCATION IN THE LENS OF NEP-2020

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Abstract: Today the Multidisciplinary education is an approach that incorporates knowledge, methods, and perspectives from different disciplines to provide holistic learning experiences. In the twenty-first century, we show the changes in the field of technological advancement, globalization, and complex social challenges have increased the importance of multidisciplinary learning in schools and higher education institutions. The National Education Policy (NEP) 2020 in India strongly emphasizes holistic and multidisciplinary education to develop critical thinking, creativity, communication, and problem-solving skills among learners. This chapter explored meaning and concept, definition, historical background, objectives, characteristics, importance, major provision of NEP-2020, the role of technology of multidisciplinary education. It also explored the role of skill development in the multidisciplinary education, sustainable development and multidisciplinary education. Furthermore, the chapter highlights the relevance of multidisciplinary education in the Indian context. The conclusion is highlighted through the multidisciplinary education is essential for creating innovative, socially responsible, and globally competent citizens.

Introduction

Education is important in the development of human life and socialization. In the traditional education system, subjects were dealt with in a compartmentalized way, e.g., science, arts, commerce and vocational courses. But today's society demands people who can think critically, be able to solve problems in real life, combine knowledge from various branches of knowledge. So it is important to develop the concept of multidisciplinary education in modern education systems.

Multidisciplinary education is an educational method which involves the learning of knowledge from various subjects that are combined together to solve a problem. It enables students to learn in the context of subjects relating to different disciplines and relate them meaningfully. In some cases, environmental studies can be interdisciplinary, such as the blending of science, geography, economics, political science and sociology. Similarly, artificial intelligence demands knowledge of computer science, mathematics, ethics, psychology and communication.

The idea of multidisciplinary learning is not new. Ancient Indian Universities like Takshashila and Nalanda encouraged the students to learn all subjects together, like philosophy, medicine, mathematics, astronomy, arts and literature. The present educational reforms, particularly the National Education Policy (NEP) 2020, are trying to restore India's holistic educational paradigm. Multidisciplinary education is regarded as a must today for training students to face the reality of the globalized world. It builds students' creative, flexible, innovative, co-operative and life-long learning abilities. Worldwide, education structures are being restructured to foster interdisciplinary and multidisciplinary learning experiences.

Meaning and Concept of Multidisciplinary Education

Multidisciplinary education is a learning approach that combines knowledge, concepts, methods, and perspectives from different disciplines to study a topic or solve a problem. In this system, subjects are not taught in isolation; rather, they are interconnected to provide comprehensive understanding.

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The Government of India under NEP 2020 defines multidisciplinary education as an approach that develops intellectual, social, emotional, physical, and moral capacities in an integrated manner.

Education Government of India in multidisciplinary learning

- Different disciplines contribute independently to a common theme.
- Students gain exposure to diverse areas of knowledge.
- Learning becomes holistic and application-oriented.
- Real-life problems are studied from multiple perspectives.

For example

Climate change involves science, economics, politics, sociology, and environmental ethics.
Public health requires knowledge of medicine, psychology, statistics, and social work.
Business management involves economics, communication, technology, and mathematics.
Thus, multidisciplinary education aims to remove rigid boundaries between subjects and encourage flexible learning.

Definitions of Multidisciplinary Education

Various scholars and educational organizations have defined multidisciplinary education in different ways. According to UNESCO, multidisciplinary education involves the integration of multiple subjects while maintaining their distinct disciplinary identities. NEP 2020 describes multidisciplinary education as a holistic approach that enables students to study sciences, arts, humanities, sports, and vocational subjects together for overall personality development. Walia (2023) stated that multidisciplinary education develops critical thinking, communication, teamwork, and problem-solving skills necessary for workplace success. These definitions indicate that multidisciplinary education promotes integrated learning experiences for comprehensive human development.

Historical Background of Multidisciplinary Education

The concept of multidisciplinary education originated from ancient times. The education in ancient India was holistic in nature. Nalanda and Takshashila universities provided education on a wide range of subjects, including medicine, astronomy, philosophy, arts, mathematics and literature.

Broad-Based Education for intellectual and moral development was also encouraged by the ancient Greek philosophers, Plato and Aristotle. In the Renaissance, the focus of education was on liberal arts and scientific exploration. but during the Industrial Revolution, education systems became quite specialised in order to cater to the needs of the industry. The subjects were split into individual disciplines which resulted in compartmentalisation of learning.

In the twentieth century, thinkers in education like John Dewey, stressed experiential and integrated learning. The interdisciplinary solutions were further accentuated by the globalization of the modern world, the development of new technologies, and social problems.

The starting exploration of the introduction of national education policy 2020 in our country has marked a very significant role toward promoting holistic education and multidisciplinary education. Various recommendation by the policy includes academic bank of credit, multiple entry exit, flexible curricula, multidisciplinary universities.

Objectives of Multidisciplinary Education

The major objectives of multidisciplinary education are:

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- To promote holistic development of learners.
- It aims at intellectual, emotional, social, physical, and moral growth.
- To develop critical thinking skills.
- Students learn to analyze problems from different perspectives.
- To encourage creativity and innovation.
- Exposure to diverse subjects enhances imagination and originality.
- To improve problem-solving abilities.
- Real-world problems require integrated knowledge from multiple disciplines.
- To enhance communication and collaboration.
- Students learn teamwork and interpersonal skills.
- To provide flexible learning opportunities.
- Learners can choose subjects according to their interests and career goals.
- To prepare students for modern careers.
- Contemporary professions require multidimensional skills and adaptability.

Characteristics of Multidisciplinary Education

1. Holistic Learning
Multidisciplinary education is education that emphasizes student development and more than just their academic achievement. Fosters the intellectual, emotional, social and moral growth of learners. Through this activity, the balanced personality and responsible citizens are created.

2. Integration of Subjects
Different subjects are connected to provide a better understanding of concepts and real-life situations. Students are taught the connections between knowledge from one discipline to another. This integration can help in the learning process become more meaningful and practical.

3. Flexibility in Curriculum
Learners have the freedom to select their interests and career path. This is flexibility and promotes self-directed learning. It also encourages learners to develop more than one skill.

4. Student Centred Learning
Multidisciplinary education is an education-based learning system that makes the learners the main body of teaching and learning. Teachers lead and instruct students based on their needs, interests and abilities. This is a strategy to foster active involvement, creativity and confidence in learners.

5. Problem Based Learning
Use of real-life examples to enhance practical understanding as part of learning. Students use information from a variety of disciplines to solve problems and to make appropriate decisions. This approach promotes critical thinking and decision making.

6. Collaborative Learning
Students collaborate in groups to complete projects, discussions and activities. The benefits of collaborative learning are that it enhances communication, teamwork, and leadership skills. It also contributes to students' tolerance of diverse opinion and perspectives.

7. Skill Development
The students acquire basic life and working skills through multidisciplinary education. These are the skills that are generally considered to be: communication, creativity, critical thinking, leadership, and technological competence. These skills are necessary to thrive in today's society.

8. Application Oriented Approach
This is a method of relating classroom learning to real life situations. Students are taught to apply theory and develop solutions to real life problems. It enhances education's usability, relevance and effectiveness.

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Importance of Multidisciplinary Education

1. Development of Critical Thinking
Pupils are taught to analyse and critically consider problems from various angles and to apply logical thinking. This enhances their thinking skills, problem-solving and decision-making abilities. Learners are also able to solve complex problems well by applying critical thinking.

2. Promotion of Creativity
Students are exposed to several disciplines which promotes innovative and creative thinking. Learners synthesize concepts and solutions across subjects to develop new solutions and concepts. This encourages creativity and ingenuity.

3. Better Problem Solving
To solve the problems of the modern world, we need to know things from the different fields. The multidisciplinary training enables students to grasp the essence of the issues and find practical solutions. It equips learners to meet the challenges of life in the real world successfully.

4. Improvement of Employability
In today's industries, employees who are versatile and skilled in a variety of areas are preferred. Multidisciplinary education is a training that supports students in various careers and responsibilities. It expands the career opportunities and professional skills.

5. Holistic Personality Development
This will help students grow in their intellectual, emotional, social and moral development. Confidence, empathy, leadership and social responsibility are developed by the learners. It assists in developing and nurturing a positive and healthy personality.

6. Encouragement of Research and Innovation
Multidisciplinary learning encourages co-operation and the sharing of ideas between disciplines. It fosters students to research and come up with new solutions. There are numerous scientific and technological breakthroughs that can be achieved as a result of cross-disciplinary collaboration.

7. Social Awareness
Pupils are increasingly made aware of cultural differences, environmental issues and social responsibilities. They develop the values of equality, sustainability and community good. This awareness helps in creating responsible citizens.

8. Lifelong Learning
Multidisciplinary education helps develop curiosity and interest in continuing education. Students are flexible with new knowledge and new tools. Lifelong learning is a habit that is necessary for acquiring personal and professional knowledge.

Multidisciplinary Education and NEP 2020

The National Education Policy (NEP) 2020 emphatically promotes the multidisciplinary and holistic education in India. The policy seeks to change the system of education by eliminating the artificial barriers between the arts, sciences, commerce and the vocational pathway.

Major Provisions of NEP 2020

1. Flexible Curriculum
With the introduction of NEP 2020, students can select subjects from various stream based on their interests and career goals. This flexibility eradicates the barriers between arts, science and commerce courses. It fosters creativity, freedom and all round learning.

2. Multiple Entry and Exit System
It is proper for students to enter and leave higher education programs without losing academic progress. Awards are made in the form of certificates, diplomas and degrees based on the length of time studied. This system is an enabling system for lifelong education and flexibility in education. Coursework based on a system of academic bank of credits.

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3. Academic Bank of Credits (ABC)
Students' academic credits are digitally recorded in the Academic Bank of Credits. To allow for easy transfer of credits from one institution to another, to continue studies easily. It facilitates the mobility and flexibility of higher education.
4. Multidisciplinary Universities
NEP 2020 is promoting the transformation of higher education institutions to become multidisciplinary. It is expected that Universities have subjects of different fields in a single campus. This will enhance the overall learning and research experiences.
5. Holistic Development
The policy is based on learners' cognitive, emotional, ethical, social and physical development. Another aspect of education is not just about grades. Its goal is to produce responsible and balanced citizens.
6. The integration of Vocational Education
Vocational education is embedded in mainstream education at school level. Pupils learn both theoretical knowledge and practical skills. This enhances their employability and skill development.
7. Promotion of Research
NEP promotes interdisciplinary and interdisciplinary research within educational institutes. Research culture is strengthened through innovation and collaboration. This helps in producing new knowledge and technological advancement.
8. Use of Technology
Technology facilitates flexible, accessible and effective learning. Multidisciplinary learning is facilitated by digital platforms, online learning and virtual classrooms. The policy is designed to educate pupils for the 21st century digital skills.

The Role of Technology in Multidisciplinary Education

1. Online Learning Platforms
Digital learning platforms offer access to courses across various disciplines and institutions. Students are able to study their interests in a variety of subjects. This means more flexibility and access in education.
2. Virtual Classrooms
Virtual classrooms are online platforms that unify students and teachers in a space for interaction. Learners will be able to engage in discussions, projects, and collaborative learning tasks. This helps to promote learning opportunities around the world.
3. Artificial Intelligence
AI educational tools customise learning based on the needs and abilities of learners. The technologies are useful for assessment, feedback, and adaptive learning. AI boosts the effectiveness of learning.
4. Digital Libraries
Digital libraries offer quick availability of books, journals and research content from various areas. Students have the opportunity to get information for research and study. This builds knowledge and learning in the classroom.
5. Multimedia Learning
Learning is more interactive, interesting and engaging through videos, animations, simulations and presentations. Students have a better understanding of difficult concepts with the help of multimedia tools. They also help to enhance attention and participation in classrooms.
6. Collaborative Tools
Platforms like Google Classroom and Microsoft Teams promote collaboration and communication among students and teachers. The tools are used to facilitate project-based and group learning. The use of technology allows for flexible, collaborative education across disciplines.

Multidisciplinary Education and Skill Development

1. Communication Skills
Students acquire effective oral, written and interpersonal communication skills. Use of group work and discussion promotes expression and confidence. Communication skills are important for academic and professional success.

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2. Critical Thinking
Integrated learning promotes students to think critically on issues from diverse perspectives. This enhances reasoning, decision making and problem solving skills. Critical thinking enables learners to approach complex challenges successfully.
3. Digital Literacy
Technology based learning enhances the students' digital skills and technical knowledge. Learners are introduced to online platforms, digital tools and virtual resources. It is critical to be digitally literate in the current world.
4. Leadership Skills
Through collaborative projects and teamwork activities, leadership is developed among students. Learners become more comfortable in taking on duties and leading others. Leadership skills foster individual and professional development.
5. Entrepreneurial Skills
Students are taught the concepts of innovation, creativity and business management. The multidisciplinary learning approach promotes entrepreneurial thinking and risk-taking skills. These skills help in creating employment opportunities.
6. Problem Solving Skills
Know-how and decision making skills are enhanced through real-life tasks and interdisciplinary-based projects. Students are able to solve real-life problems. These skills are essential for functioning in a flexible workplace.

Multidisciplinary Education and Sustainable Development

1. Environmental Awareness
The student grasps scientific, social and ethical issues surrounding the environment. They are informed about the theme of climate change, pollution and conservation. This awareness promotes sustainable lifestyle and protection of the environment.
2. Social Responsibility
Students are educated in empathetic, ethical, and civic ways. Students develop an increased awareness of the social issues and the good of the community. This will aid in the development of good citizens.
3. Economic Development
Multidisciplinary education is an education that produces skilled and knowledgeable human resources. Professional people help a country to grow, innovate and be productive. Education is a key factor in economic development.
4. Global Citizenship
Pupils are made aware of issues around the world, difference and international cooperation. They develop tolerance, respect and intercultural awareness. This will foster peace and unity for the world.
5. Sustainable Solutions
Integrated knowledge supports students to respond to issues like poverty, inequality and climate change. Multidisciplinary approach promotes innovative and sustainable solutions. Multidisciplinary education is firmly advocated by UNESCO as one of the education solutions for Sustainable Development Goals (SDGs).

Multidisciplinary Education in Indian Context

The concept of holistic education is a legacy in India. The traditional educational systems stressed 'all-in-one' learning. Later, though, with colonies and industry, there were the rigid disciplinary divisions. The NEP 2020 has the goal of resurrecting the Indian learning model which encompasses learning through a holistic perspective while keeping it in synchronize with international education standards.

Indian universities are gradually introducing

- Choice Based Credit System (CBCS)
- NEP-2020, New curriculum

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- Holistic development
- Skill-based courses
- Liberal arts programs
- Research-oriented learning
- Vocational integration
- Online and blended learning

Conclusion

Multidisciplinary education is a necessary method to solve problems of the modern world. It encourages learners to develop their whole person, creative, critical, collaborative and problem-solving abilities. Education is more meaningful, flexible and relevant to real-life situations by the integration of knowledge from different disciplines. The National Education Policy 2020 has offered ample guidance for getting multidisciplinary education implemented in India. The policy seeks to change the existing education system into learning-centred education systems that promote innovation and lifelong learning. Multidisciplinary learning is not only an educational reform of the twenty-first century, but it is required for sustainable development, employability, and global citizenship. Stakeholders in education – including schools, teachers, policy makers and society – need to collaborate to ensure that learners are ready for the future in a comprehensive learning environment.

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IMPACT OF NEP 2020 ON CURRICULUM TRANSFORMATION TOWARDS MULTIDISCIPLINARY LEARNING

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Abstract: Among all the policies introduced to improve India's education system, the National Education Policy (NEP) 2020 is considered one of the most significant, diversified and comprehensive reforms in the Indian education system with the aim of transforming the whole education structure and promoting multidisciplinary learning. This study was carried out to know the changes introduced in the curriculum through NEP 2020 and investigating how multidisciplinary curriculum practices are being implemented in higher education institutions. Researcher collect the data from various secondary sources like book, journal, articles, previous research articles. The finding of the study shows that NEP 2020 has plays a transformative role in a paradigm shift in the Indian education system. It promotes diversity, critical thinking, holistic development and skill-based education. The effective implementation of the policy can create an inclusive, modern, and learner cantered education system. However, the implementation of this NEP 2020 policy faces several challenges due to inadequate infrastructure and lack of trained faculty members in many rural as well as urban institutions.

Introduction

As everyone knows that education is one of the most important aspects of human life. Education not only improves the personal growth of an individual but also plays a vital role in the development of society and the nation. By education individuals can gain knowledge, understanding, develop skills and build moral values. Keeping the importance of educational development in mind, the Government of India has undertaken various initiatives and reforms to improve the quality, accessibility and effectiveness of education across the country. Indian education system has undergone several reforms through different national education policies. There are three major policies introduced in 1968, 1986 and 2020. Among them, NEP 2020 is considered as the most comprehensive policy because of its divergent vision towards the modern education system for 21st century. M.K. Gandhi emphasized that education should develop the head, hand and heart meaning intellectual, practical and moral development. According to Gandhi "By education, I mean an all-round drawing out of the best in child and man – body, mind and spirit." Similarly, NEP 2020 emphasizes holistic and multidisciplinary education for the all-round development of the learner (Wikipedia). The first national education policy on education 1968 was based on the recommendation of the Kothari Commission. It focuses on the value orientation, national unity, equal educational opportunities and the three-language formula and had limited focus on practical skills and technology. On the other hand, The National Policy on Education 1986 focuses on access, equity and quality education. it also focuses on women education, adult literacy, child cantered learning and open blackboard to improve school infrastructure. However, the policy still gave deep emphasis on examination-based judgment and rote learning. Due to various flaws in these policies, the Indian government took the initiative to formulate a new policy. NEP 2020 differs significantly from the earlier policies. It emphasises holistic and multidisciplinary education rather than memorization-based learning.

National Education Policy 2020

NEP 2020 is the third and most comprehensive education policy in Indian history. It developed under the chairmanship of Dr. Krishnaswamy Kasturirangan, approved by the Union Cabinet of India on 29th July 2020, outline the vision of the new education system of India. The vision of this policy is to build an education system rooted in Indian ethos that contributes directly to transforming India by providing high quality education to all, thereby making India a global knowledge superpower (Sharma, 2025). This policy promotes creativity, critical thinking, communication skills and problem-solving abilities to prepare students for the challenges of the 21st century. NEP 2020 is developed on the five foundational pillars of Access, Equity, Quality, Affordability and Accountability. It aims to transform India into a vibrant knowledge society and global knowledge superpower. One of the major features of NEP 2020 is holistic and multidisciplinary education. Students are encouraged to study subjects from different disciplines according to their interests. This policy provides the student to choose various subjects according to

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their interested areas. It also removes the rigid boundaries between arts, science and commerce streams, allowing flexibility in education. It also emphasis on student's practical learning, internships, coding, digital literacy, experiential learning, skill based and vocational education to improves employability and self-reliance among them.

Multidisciplinary And Holistic Education

Multidisciplinary education refers to the combination of different subjects. It not only includes arts, science and commerce but also includes technology, vocational education, skill-based education, home science, humanities etc. Unlike traditional, fragmented education systems, where courses are taught in isolation, the multidisciplinary approach encourages collaboration between different disciplines without integrating then (Jacobs, 1989)). For example of a multidisciplinary curriculum, a science student can also study history, politics, music, economics, philosophy or computer application. This variety of subjects and flexibility in curriculum helps students gain diverse knowledge from various aspect. The National Education Policy (NEP) 2020 envisions a multidisciplinary approach as the cornerstone of reforms in both school education and Higher education and place special emphasizes on 21st centuries multidisciplinary curriculum in multiple aspect. Taking care to remove the artificial barriers that exist within the education system, the policy encourages flexibility in subject choice, allowing students to study a combination of subjects such as history and computer science or physics and music, in the 'academic' and 'vocational' or 'arts', 'commerce' and 'science' branches (Ministry of Education, 2020). NEP 2020 states that the strategy aims to build the critical thinking, creativity, problem solving and innovation skills that are essential for survival in today's connected world.

The multidisciplinary approach is different from interdisciplinary and transdisciplinary approach. The interdisciplinary approach connects various subjects by combining their concepts and methods, example like environmental studies integrating biology and geography. The transdisciplinary approach goes beyond subject boundaries and focuses on solving real life problems through holistic learning. Therefore, the new education policy NEP 2020 strongly focuses these approaches to make education flexible, innovative, skill oriented and real life based for the holistic development of the learner (Bhoi, 2025).

Rational of the Study

India is a nation with very rich, diverse and comprehensive culture-based society. The country is characterised by different languages, religion, tradition, values, art forms and indigenous knowledge systems. This cultural diversity reflects the multicultural nature of Indian society. Therefor the curriculum that is part of the Indian education system must also be much more influential and comprehensive which can affect the real lives of children. The traditional education system as well curriculum focuses on the behavioural changing aspect among child and it based on a rigid mentality and stream oriented, where students have only few fixed options to choose as well, they were restricted to separate disciplines such as Arts, Science and Commerce. This limited the development of creativity, innovation, critical thinking and practical understanding. However, in the rapidly changing global and technological world, students require knowledge and skills from multiple disciplines to become competent and socially responsible citizens. Recognizing this need, the NEP 2020 introduced major reforms regarding the curriculum as well as the whole education system. The vision on National Education Policy (NEP) 2020 is to make the whole Indian education system more strengthen, inclusive, holistic, enrich and flexible. NEP 2020 emphasizes multidisciplinary education by integrating arts, science, humanities, home science, vocational education, technical education, commerce, skill-based education etc. This policy encourages students to study diverse subjects according to their area of interest and future purpose. As educational institutions are gradually implementing these changes, it becomes important to examine whether the objective of multidisciplinary learning is being effectively achieved or not. The rational of the study lies in analysing the changes introduced in the curriculum and to understanding the context to which NEP 2020 has influence curriculum transformation in higher education institutions. Thus, this research is significant in analysing the role of NEP 2020 in modification in the whole education system and reshaping the curriculum.

Review Related Literature

Bhoi, E. (2025). Conducted a study on "Promoting a multidisciplinary approach in view of NEP2020: A thematic perspective." The objective of the study was to examine how NEP 2020 promotes interdisciplinary education in India. Researcher conducted

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qualitative thematic analysis method based on NEP 2020 document. Findings shows that NEP 2020 strongly support smarter disciplinary education by promoting flexible and holistic learning. Sharma, S. (2026). Conducted a study on "National education policy 2020 and multidisciplinary approach." The purpose of the study was to examine India's NEP 2020 and its impact on promoting a multidisciplinary framework in higher education. Distribute quantitative research design was adapted by the researcher. Also, researcher collect various data from secondary sources. The result of the study revealed that NEP 2020 has a positive impact on promoting multidisciplinary framework in higher education and it also nurtures critical thinking, creativity and holistic development among learners. Sharma, A. (2025). Conducted a study on "NEP 2020 and multidisciplinary institutions: Fostering innovation and research." The main objective of the study was to determine the role of multidisciplinary institutions in achieving the goals NEP 2020. In this study researcher used qualitative methods and collected the data from media secondary sources. Findings revealed that the multidisciplinary institutions, aligned with NEP 2020, can transform higher education by promoting critical thinking, research, innovation and holistic learning through successful implementation. Maheshwari, K. et al. (2025) Conducted a study on "NEP 2020 and Roadmap for holistic and multidisciplinary education." The objective of the study was to investigate the impact of NEP 2020 on holistic and multidisciplinary management education, focusing on faculty preparedness and student adaptability in MBA institutions under Pune university. Researcher used quantitative research design. A total of 400 educators across several MBA colleges were selected as a sample. Random sampling, regression and ANOVA tests were used in the study The result of the study revealed that the effectiveness of NEP 2020 mighty disciplinary education relies heavily on faculty preparedness and student adaptability. Langal, R. et al. (2025). Conducted a study on "Multidisciplinary education in NEP 2020." The purpose of the study was to investigate the effects of the multidisciplinary education model on university level students' academic achievement. Researcher used a qualitative and analytical methodology. Findings revealed that multidisciplinary education can enhance creative thinking, problem solving abilities among the university level students. Bose, C.D. (2024) Conducted a study on "NEP 2020 mediated transformation in Higher Education." The main objective of the study was to examine the impact of NEP 2020 on transforming higher education through multidisciplinary, holistic and skill-based learning. In this study researcher used descriptive method based on various secondary sources. The study reviewed that NEP 2020 improves the quality, accessibility, accountability and multidisciplinary education in higher education.

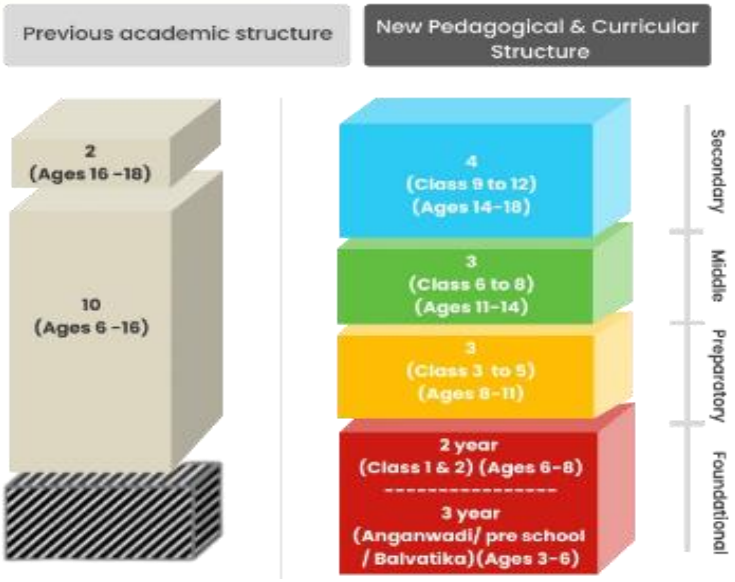
Research Objectives

1. To analyse the changes introduced in the curriculum through NEP 2020.
2. To investigate how multidisciplinary curriculum practices are being implemented in higher education institutions in the context of NEP 2020.

Discussion

Objective 1: To analyse the changes introduced in the curriculum through NEP 2020

The changes introduced to the curriculum through the NEP 2020 have brought about a significant transformation in the Indian education system. Moving away from the previous rote-learning-based approach, this policy places special emphasis on skills, creativity, critical thinking, and multidisciplinary education. The primary objective of the NEP 2020 is to shape students in such a way that they not only excel in examinations but are also capable of solving real-world problems (Ministry of Education, 2020). One of the most significant changes is the introduction of the new 5+3+3+4 educational structure: Foundation, Preparatory, Middle, and Secondary stages, replacing the old 10+2+3 framework. This new structure is designed based on the age-appropriate mental and intellectual development of children. Consequently, opportunities for play-based learning, activity-based education, and the development of linguistic skills for children have expanded right from the primary level. The first five years include pre-primary education (classes 1-2), the next 3 years focus



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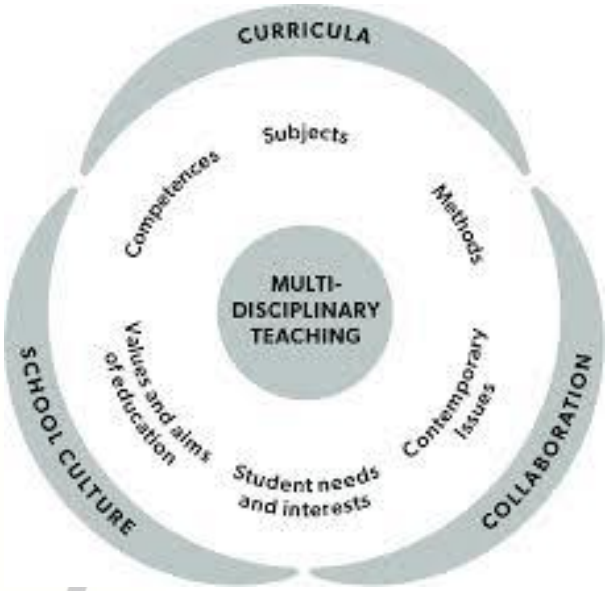
on activity-based education (classes 3-5), the following 3 years emphasizes experimental learning, critical thinking and skill orientation (classes 6-8), and the final4 years provide multidisciplinary and flexible subject choices (classes 9-12).

Conversely the NEP 2020 has made the education system more flexible and student-centric. Previously, the education system featured a distinct segregation among the Science, Arts, and Commerce streams, which limited students' opportunities to select a combination of subjects aligned with their specific interests. However, this barrier has been largely eliminated under the new education policy. Now, students can pursue subjects from various disciplines concurrently, based on their individual preferences and aptitudes. For instance, a student can opt to study subjects such as Fashion Design or Theatre Arts alongside Mathematics and Physics. Consequently, this will enhance opportunities for students to cultivate creative thinking, practical skills, and multidisciplinary knowledge. Such a multifaceted approach to education will also play a pivotal role in their future career prospects and personal development. This policy also places special emphasis on skill-based education. It proposes the introduction of vocational education, coding, and internships starting from the sixth grade. Through this, students will be able to acquire technical knowledge, job-oriented knowledge and practical experience from an early age. Consequently, they will be better prepared for future employment opportunities (National education policy, 2020).



Significant changes have also been introduced to the assessment system. Previously, the primary objective of examinations was merely to secure marks; however, the NEP 2020 places emphasis on conceptual understanding, analytical abilities, and problem-solving skills. In addition to making board examinations simpler and stress-free, emphasis has been placed on continuous assessment. This comprehensive policy introduced to the curriculum in the realm of higher education. Through initiatives such as four-year undergraduate programs, a Multiple Entry and Exit system, and the Academic Bank of Credits, students will be able to pursue their education with greater autonomy. students are able to receive a certificate based on the duration of the course, and they can also re-enter later to continue their studies (UGC, 2021). They will be given a Certificate for completing one year, Diploma for two years, a Bachelor's degree for 3 years, and a Bachelor's Degree with Research for four years of completion. This policy also specially emphasis has also been placed on mother-tongue-based education. It has been recommended that instruction be provided in the mother tongue or a regional language up to at least the fifth grade. As a result, students will be able to grasp the subject matter with ease, and their linguistic foundation will be further strengthened.

Overall, it can be said that the NEP 2020 has rendered the Indian curriculum more modern, skill-based, student-centric, and multifaceted. Through this policy, an endeavour has been made to transform education from being merely examination-centric into a life-oriented and practical-based system—a shift that will help make the future educational framework more effective and of international standard.

Objective 2: To investigate how multidisciplinary curriculum practices are being implemented in higher education institutions in the context of NEP 2020.

One of the primary objectives of the NEP 2020 is to transform India's higher education system into one that is more multidisciplinary, practical, holistic, skill-oriented, and student-centric. Through this policy, particular emphasis has been placed on providing students with opportunities to acquire knowledge across diverse subjects, rather than confining them to a single, specific discipline. Under the previous education system, subject-specific compartmentalization was, in most instances, extremely rigid; consequently, students had limited opportunities to pursue a combination of subjects aligned with their individual interests and aptitudes. However, the NEP 2020 challenges this conventional paradigm by prioritizing the concept of multidisciplinary education within the higher education landscape. As a result, significant changes are currently being observed in the curricular frameworks of various universities and colleges (Ministry of Education, 2020). Currently, many higher education institutions have taken initiatives to introduce interdisciplinary pedagogical approaches. Through this system, students are afforded the opportunity to acquire knowledge in other subjects alongside their core discipline. For instance, a student majoring in Economics can opt to study subjects such as Data Analysis, Computer Applications, or Sociology. Similarly, a student pursuing

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Literature can simultaneously study subjects like Mass Communication or Psychology. Consequently, this fosters multidimensional thinking among students and equips them with the ability to analyse real-world problems from various perspectives (UGC, 2021). Another significant aspect of this policy is the introduction of the Academic Bank of Credits (ABC) and the Multiple Entry and Exit System. Through this framework, students are able to store academic credits earned at various institutions and, when necessary, transfer them to another institution. Consequently, the education system has become more flexible, providing students with the opportunity to pursue their studies according to their own convenience. Even those who are compelled to discontinue their studies midway for any reason are now afforded the opportunity to earn a certificate, diploma, or degree after a specific period.

However, the effective implementation of multidisciplinary curricula in higher education institutions is currently facing various challenges. Although the NEP 2020 was introduced with the objective of making the education system modern and flexible, not all educational institutions across the country are yet fully prepared for this transformation. In particular, many government and rural colleges suffer from a noticeable lack of adequate infrastructure, modern technology, and advanced educational resources. Facilities essential for technology-driven learning; such as smart classrooms, digital laboratories, and high-speed internet connectivity, remain limited in many instances, thereby hindering the implementation of the new pedagogical framework. Furthermore, while a multidisciplinary education system necessitates a workforce of skilled and trained faculty members, the number of such educators remains insufficient in many institutions. As the majority of teachers have long been accustomed to traditional, subject-specific teaching methodologies, they are taking some time to adapt to the new interdisciplinary or multidisciplinary approaches. Moreover, a lack of adequate training regarding teaching strategies aligned with the new curriculum, the effective integration of technology, and research-based pedagogical methods is further slowing down the implementation process. Apart from this, to effectively implement a multifaceted education system, it is crucial to enhance coordination among educational institutions. Curriculum planning, teacher training, and the utilization of technology need to be further improved to ensure that students can fully benefit from this policy. Concurrently, it has become essential to structure the curriculum by prioritizing students' interests, skills, and the demands of their future careers.

Overall, it can be said that the National Education Policy (NEP) 2020 has ushered in a significant transformation within India's higher education system. Through the implementation of multidisciplinary curricula, the education system is becoming more modern, flexible, and practical. Consequently, students are no longer confined to a single specific subject; instead, they are able to acquire integrated knowledge across various fields—a process that will help enhance their creativity, problem-solving skills, and employability prospects. In the future, the successful implementation of this policy will play a pivotal role in further aligning India's higher education with global standards.

Conclusion

The National Education Policy 2020 (NEP 2020) has ushered in a new perspective within the Indian education system, placing special emphasis on making the curriculum more flexible, skill-based, and student-centric. This study reveals that NEP 2020 seeks to move away from the conventional rote-learning-based education system to foster an educational environment where students not only acquire theoretical knowledge but also develop real-world problem-solving abilities, creative thinking, communication skills, and critical analytical capabilities. As a result of these curricular changes, interdisciplinary integration is increasing, and students are gaining the opportunity to select subjects aligned with their personal interests and professional aspirations. Through this process, education is becoming more meaningful and life-oriented. Research has further revealed that one of the most significant aspects of the NEP 2020 is the promotion of multidisciplinary education. Higher education institutions are gradually introducing curricula that establish interconnections among science, humanities, commerce, technology, and the arts. Consequently, students are gaining the opportunity to acquire knowledge across diverse fields rather than being confined to a single specific discipline. This form of multidimensional education can prove instrumental in enhancing students' skill sets, thereby enabling them to keep pace with contemporary employment trends and global demands. Furthermore, the integration of research-oriented learning, project-based pedagogy, and skill-development courses is playing a pivotal role in improving the overall quality of education.

However, certain limitations have also been observed in the implementation of this policy. Many higher education institutions lack adequate infrastructure, technological facilities, and trained faculty; factors that could hinder the implementation of multidisciplinary curricula. Furthermore, disparities between rural and urban educational institutions, financial constraints, and administrative complexities may somewhat slow down the effective implementation of the policy. Nevertheless, positive initiatives undertaken by various educational institutions, coupled with the government's planned measures, are helping to gradually translate this transformation into reality.

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Overall, the NEP 2020 represents a significant endeavour to transform the Indian education system into one that is modern, inclusive, and forward-looking. Changes in the curriculum and the implementation of multidisciplinary education can facilitate the holistic development of students' knowledge, skills, and human values. Although its complete and successful implementation necessitates long-term planning, adequate training, infrastructural development, and concerted efforts, it appears that, through this policy, Indian higher education is advancing toward a new horizon.

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INDIAN KNOWLEDGE SYSTEM IN THE CONTEXT OF NATIONAL EDUCATION POLICY 2020

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Abstract: The Indian Knowledge System (IKS) represents the rich intellectual, cultural, scientific, and philosophical traditions developed in the Indian subcontinent over centuries. The National Education Policy (NEP) 2020 has emphasized the revival and integration of IKS into mainstream education to promote holistic and value-based learning. The present study examines the concept and significance of IKS, analyses the role of NEP 2020 in promoting indigenous knowledge traditions, and explores the educational benefits of integrating IKS into modern education. The study follows a qualitative research design based on secondary sources such as books, policy documents, and research articles. The findings reveal that IKS contributes to ethical development, critical thinking, environmental awareness, cultural identity, and interdisciplinary learning. NEP 2020 plays a significant role in revitalizing traditional knowledge through curriculum reforms, promotion of Indian languages, and research initiatives. The study concludes that integrating IKS into contemporary education can foster culturally rooted, socially responsible, and globally competent learners while preserving India's rich heritage and promoting sustainable educational development.

Introduction

The Indian Knowledge System (IKS) has gained institutional recognition through the National Education Policy (NEP) 2020, which emphasizes the integration of India's intellectual, cultural, and scientific traditions at all levels of education (Ministry of Education, 2020). IKS is rooted in Vedic, Upanishadic, Buddhist, and Jain traditions, along with classical Sanskrit and regional knowledge systems encompassing disciplines such as philosophy, mathematics, astronomy, Ayurveda, linguistics, ecology, performing arts, and education (Kapoor & Sharma, 2021). Historically, indigenous educational institutions such as Gurukuls, Pathshalas, monasteries, and renowned universities like Nalanda and Takshashila contributed significantly to India's epistemological and socio-cultural development (Altekar, 2009). However, during the colonial era, Macaulay's Minute on Education in 1835 promoted an English-based curriculum that marginalized indigenous knowledge traditions by labeling them as unscientific (Macaulay, 1952). This led to the decline of traditional learning institutions and indigenous epistemologies (Dharampal, 1983). Although post-independence India developed a national education system, a structured policy for reviving IKS was largely absent until the introduction of NEP 2020 (Ministry of Education, 2020).

Meaning and significance of Indian Knowledge System (IKS)

The Indian Knowledge System (IKS) refers to the rich body of indigenous knowledge developed in the Indian subcontinent over thousands of years through traditions such as the Vedas, Upanishads, Buddhist and Jain philosophies, and regional practices. It includes diverse fields such as philosophy, mathematics, astronomy, Ayurveda, linguistics, agriculture, ecology, performing arts, and education (Kapoor & Sharma, 2021). IKS emphasizes holistic learning by integrating intellectual, spiritual, ethical, and practical dimensions of life. Unlike fragmented approaches to knowledge, it promotes harmony between humans, nature, and society (Radhakrishnan, 2009). The significance of IKS lies in its ability to provide value-based and sustainable approaches to contemporary challenges. It contributes to the preservation of cultural heritage, ethical living, environmental consciousness, and holistic well-being. In the educational context, IKS encourages critical thinking, self-discipline, experiential learning, and moral development

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(Ministry of Education, 2020). The National Education Policy 2020 highlights the importance of integrating IKS into mainstream education to strengthen cultural rootedness and promote multidisciplinary learning. Thus, IKS serves as an important foundation for building a balanced, inclusive, and culturally connected society.

Literature Review

The reviewed literature highlights the growing importance of the Indian Knowledge System (IKS) within the framework of the National Education Policy (NEP) 2020. Rajput et al. (2025) found that awareness, perception, and attitudes toward IKS did not significantly differ across educational qualifications, whereas cultural, ethical, and interdisciplinary relevance showed significant variation. Their study emphasized that higher education enhances understanding of the ethical and transdisciplinary potential of IKS. Similarly, Dei (2025) stressed the importance of reviving India's heritage knowledge traditions in higher education under NEP 2020. Dixit et al. (2025) discussed the strengths and challenges of integrating IKS into higher education, noting that such integration requires gradual implementation. Mandavkar (2025) highlighted that NEP 2020 aims to bridge educational gaps, promote language resources, technology, and research in IKS, though challenges remain in effective implementation. Das (2024) emphasized India's traditional values and the inclusion of value-added courses such as Yoga education in universities. The literature also reflects the therapeutic and ecological dimensions of traditional Indian knowledge. Ancient texts such as Nātyaśāstra, Caraka Samhita, and Samgītaratnākara recognize the medicinal and holistic benefits of music. Furthermore, environmental studies highlighted the importance of sacred groves, biodiversity conservation, and ecological awareness in response to global environmental challenges (Das, 2023; Kumar, 2021; Patra, 2016).

Research Questions

a) What is the significance of Indian Knowledge System in the context of NEP 2020?
b) How does NEP 2020 promote the integration of IKS into education?
c) What are the educational benefits of incorporating IKS in modern educational practices?

Objectives of the Study

a) To understand the concept and significance of Indian Knowledge System.
b) To examine the role of NEP 2020 in promoting Indian Knowledge System.
c) To analyze the educational benefits of integrating IKS into modern education.

Methodology: The present study follows a qualitative research design. The study is based on secondary data sources specifically books and research article.

Results and Discussion

Concept and Significance of Indian Knowledge System: Indian Knowledge System refers to the accumulated wisdom, practices, and intellectual traditions developed in the Indian subcontinent through sources such as the Vedas, Upanishads, Buddhist and Jain philosophies, Ayurveda, Yoga, astronomy, mathematics, linguistics, ecology, and performing arts (Kapoor & Sharma, 2021). IKS emphasizes holistic development by integrating intellectual, moral, spiritual, and practical dimensions of life. Understanding the concept of IKS is significant because it helps learners recognize the richness of India's cultural and intellectual heritage. It promotes value-based education, ethical living, environmental consciousness, and harmony between human beings and nature (Radhakrishnan, 2009). The National Education Policy (NEP) 2020 strongly advocates the integration of IKS into mainstream education to develop culturally rooted, globally competent, and socially responsible individuals (Ministry of Education, 2020). Through this objective, learners can critically examine how traditional Indian wisdom contributes to sustainable development, mental well-being, and interdisciplinary learning. Moreover, studying the significance of IKS encourages the preservation and revitalization of indigenous knowledge traditions that were marginalized during the colonial period.

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It also helps bridge the gap between traditional knowledge and modern scientific approaches, thereby fostering innovation and holistic education in contemporary society (Dharampal, 1983).

Role of NEP 2020 in Promoting Indian Knowledge System: The NEP 2020 recognizes India's rich intellectual and cultural heritage and advocates incorporating Indian traditions, languages, arts, philosophy, Yoga, Ayurveda, and indigenous practices into the curriculum at different levels of education (Ministry of Education, 2020). The policy seeks to develop an education system that is rooted in Indian ethos while maintaining global standards of quality and innovation. Examining the role of NEP 2020 is significant because it highlights the policy's efforts to create holistic, multidisciplinary, and value-based education. The policy encourages experiential learning, critical thinking, ethical development, and environmental consciousness, which are deeply embedded in the Indian Knowledge System (Kapoor & Sharma, 2021). NEP 2020 also promotes the use of Indian languages, traditional arts, and research on indigenous knowledge to strengthen cultural identity and national pride. Furthermore, the policy plays an important role in bridging the gap between traditional wisdom and contemporary education by encouraging research, innovation, and interdisciplinary approaches. It attempts to restore the relevance of indigenous knowledge traditions that were marginalized during colonial rule (Dharampal, 1983). Thus, the implementation of NEP 2020 can contribute significantly to the revitalization of Indian Knowledge Systems and the development of culturally grounded and socially responsible learners.

Educational Benefits of Integrating IKS into Modern Education: The integration of IKS into modern education promotes a balanced approach that combines intellectual, ethical, spiritual, cultural, and practical dimensions of knowledge (Kapoor & Sharma, 2021). Indian Knowledge System includes diverse disciplines such as Yoga, Ayurveda, philosophy, mathematics, ecology, linguistics, and performing arts, which collectively support the all-round development of learners. Analyzing the educational benefits of IKS is important because it enhances value-based education, critical thinking, creativity, and experiential learning. Traditional Indian educational practices emphasized self-discipline, moral values, teacher-student relationships, and learning through observation and practice, which remain relevant in present-day education (Radhakrishnan, 2009). The integration of IKS also helps learners develop environmental awareness, cultural identity, emotional well-being, and social responsibility. Furthermore, it encourages interdisciplinary and multidisciplinary learning, which aligns with the vision of the National Education Policy 2020 (Ministry of Education, 2020). Incorporating IKS into modern education can also bridge the gap between traditional wisdom and scientific knowledge, fostering innovation and sustainable development. It provides learners with culturally rooted perspectives while preparing them to address contemporary global challenges. Therefore, integrating IKS into education contributes significantly to holistic, inclusive, and sustainable educational development.

Conclusion

In conclusion, the Indian Knowledge System (IKS) represents a rich and holistic tradition of knowledge that integrates intellectual, ethical, spiritual, and practical dimensions of life. The National Education Policy 2020 has played a significant role in reviving and promoting IKS by encouraging its integration into mainstream education. The inclusion of indigenous knowledge traditions in modern education helps foster value-based learning, critical thinking, cultural awareness, environmental consciousness, and holistic development among learners (Ministry of Education, 2020). Furthermore, integrating IKS into contemporary educational practices bridges the gap between traditional wisdom and modern scientific approaches, thereby supporting interdisciplinary learning and sustainable development. The educational relevance of IKS lies in its ability to nurture culturally rooted, socially responsible, and globally competent individuals. Therefore, the revival and implementation of IKS through education can contribute significantly to preserving India's heritage while addressing contemporary educational and societal needs.

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