ROLE OF INDIAN KNOWLEDGE SYSTEMS IN MODERN EDUCATION

Dr. S. Tamilsenthil *M.Sc., M.Phil., Ph.D.,*
Assistant Professor in Computer Applications
Sona College of Arts and Science, Salem
stalinsenthil@gmail.com

https://doi.org/10.34293/blp.9789395659895.ch010

Abstract

Over the course of millennia, Indian Knowledge Systems (IKS) have developed into a broad and diverse intellectual legacy that encompasses fields like philosophy, physics, mathematics, linguistics, medicine, the arts, and ecology. IKS, which has its roots in a holistic worldview, highlights the connections between nature, human existence, and the cosmos and provides insights for ethical living, sustainable development, and intellectual endeavors. IKS has had a significant impact on both Indian and international intellectual traditions, from the development of the notion of zero and advancements in astronomy to Ayurveda, yoga, grammar, music, and architecture.

Concern over the potential marginalization of indigenous knowledge systems in favor of Western-centric, narrowly defined paradigms has grown in recent years due to the fast globalization of education and information. By reaffirming the importance of IKS and including it into the regular curriculum, the National Education Policy (NEP) 2020 aims to correct this disparity. The policy emphasizes the necessity of a well-rounded curriculum that fosters critical thinking, creativity, and values-based education in addition to transdisciplinary learning and cultural rootedness.

This chapter examines the development of IKS over time, its guiding ideals, and its ongoing applicability in tackling modern issues like health crises, environmental sustainability, and moral conundrums in science and technology. It also looks at real-world examples of how to incorporate IKS into contemporary curricula, such as research facilities, curriculum design, community involvement, and digital platform usage. It also tackles issues like the danger of cosmetic inclusion, the necessity of thorough validation, and the significance of preparing teachers to interact with IKS in a meaningful way.

By establishing links between traditional knowledge and contemporary demands, this chapter makes the case that IKS is a living, breathing body of knowledge that can influence education in ways that are more inclusive, contextually aware, and holistic. It is therefore possible to develop learners who are not just competent and informed but also culturally aware, ethically conscious, and internationally responsible by incorporating IKS into the NEP 2020 framework.

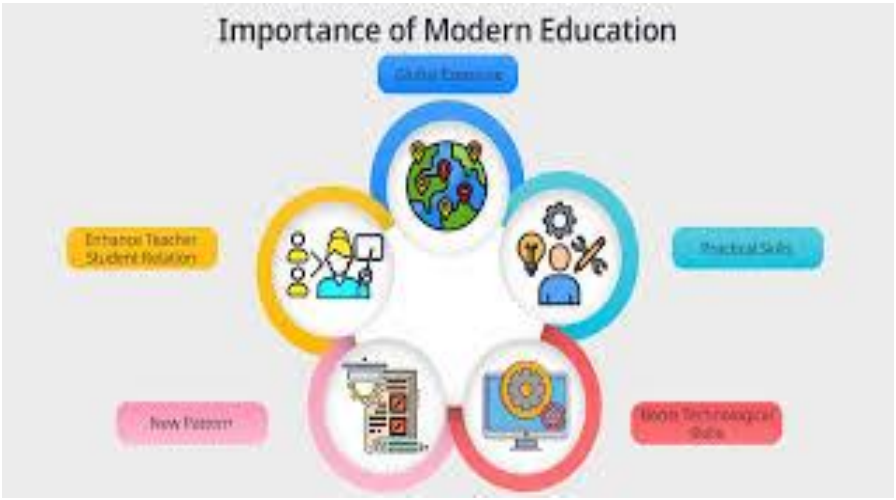
Keywords: *Indian Knowledge Systems (IKS); National Education Policy (NEP) 2020; Holistic Education; Indigenous Knowledge; Cultural Heritage; Sustainability; Ayurveda; Yoga; Traditional Knowledge; Value-based Learning; Interdisciplinary Education; Knowledge Integration; Indian Philosophy; Modern Education.*

Introduction

An offshoot of the Indian cultural heritage, Indian Knowledge systems (IKS) form one of the oldest and the most extensive traditions of knowledge in the world. IKS emerged as a holistic perspective on the state of things as philosophy, physics, mathematics, arts, health, language and ecology were interconnected as to reflect a single understanding of the universe, and an entire life. Three concepts that have directed this system are pursuit of truth (satya), accord between

978-93-95659-89-5

the individual, community, and nature and harmony (samatva). Modern Education was portrayed as important as shown in the diagram.

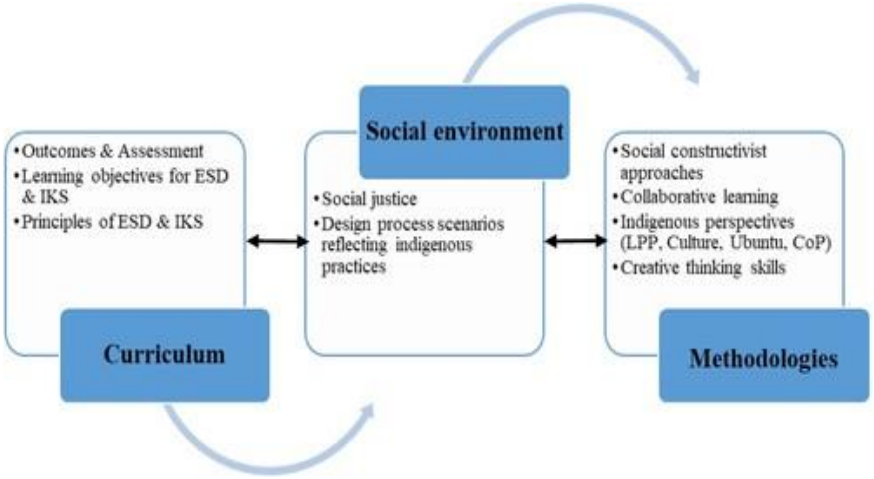


India contributed a lot to world knowledge with its innovative ideas and approaches during thousands of years. Accurate astronomical calculations by Aryabhata and Bhaskara promoted scientific thinking, Ayurveda and Yoga provided complex systems about health and well-being, Panini made a most significant contribution in the sphere of linguistics by his Ashtadhyayi, the invention of zero and the place-value system changed the face of mathematics and the ancient ecological practices showed a sustainable life many ages before the idea became fashionable. Such contributions serve as a display of the highly experiential, deeply spiritual, and morally ethical character of IKS as well as its technological achievements.

Nevertheless, IKS was relegated and often disregarded as old fashioned as a result of colonial education rules and rising prominence of Western knowledge systems. This led to the fact that the new generations in India became alienated to its own intellectual history. The relevance that older knowledge poses to addressing contemporary problems, including health crises, climate change, ethical concerns over technology, and globalization, is being re-realized on a national and international scale over the last few decades.

A major milestone of change in this direction is the National Education Policy (NEP) 2020, which directly claims inclusion of IKS in the mainstream education. By so doing it seeks to provide a globally competitive education system which is multi disciplinary, values based and is anchored on the Indian culture. The integration of IKS promotes creativity, sustainability, and cultural confidence in the learners through supplementing modern approaches to scientific inquiry with indigenous perspectives, instead of substituting them.

This chapter gives historical development of Indian knowledge systems, tenets held by these and the current applicability of information systems. It also explores ways in which they can be included in modern education and presents an argument that by including them it is possible to stimulate inclusive, contextually aware and multifaceted learning among new generations to come.

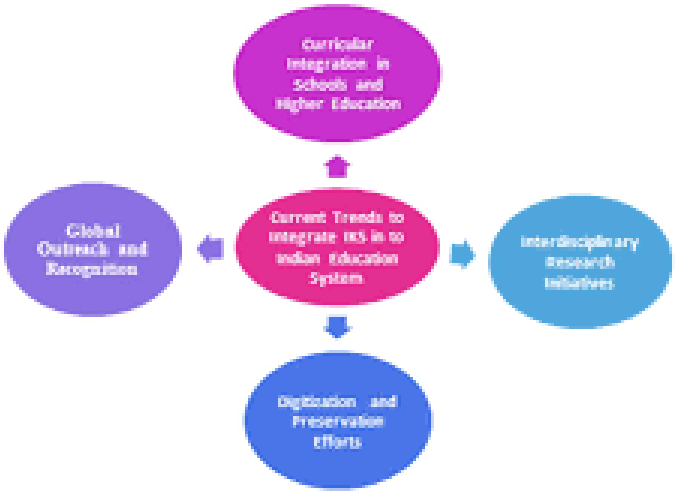


Understanding Indian Knowledge Systems (IKS)

Definition and Scope

Indian Knowledge Systems (IKS) is the massive accumulated and amassed body of knowledge that the Indian civilizations have created and nurtured over thousands of years. IKS is a way of looking at the world that includes everything philosophy, science, art, ecology, medicine, language and spirituality. It rests on active observation, scientific inquiry, oral history and written texts.

IKS is inherently interdisciplinary and emphasizes a holistic view--seeking connections between the material, intellectual and spiritual aspects of life--as opposed to the highly specialized disciplines in current practice. It extends beyond its problem-solving capability to the quest of increased awareness, the welfare of the society, and how to live in harmony with the environment. The life cycle of Integrating the Indian Knowledge System into Education through NEP-2020 can be illustrated as given below.



The domain of IKS covers

- Philosophy and Epistemology- systems of logic, metaphysics and theories of knowledge.
- Mathematics and Astronomy - contributions including zero, algebra, geometry, models of planets and calendars.

978-93-95659-89-5

- Health and Medicine -holistic healing traditions Ayurveda, Yoga, Siddha, Unani.
- Linguistics and Literature- Sanskrit language, grammar, poetics, and oral narrative and literary traditions of multilingual communities.
- Ecology and Agriculture: Ecology and agriculture are discussed as the sustainable approach to water management, biodiversity and soil conservation.
- Arts and Aesthetics- music, dance, architecture, sculpture and design that derive their foundation on philosophical systems.

Accordingly, IKS is more than a storehouse of ancient knowledge; it is a living, evolving knowledge system that continues to bring innovation, sustainability and cultural identity in the modern day world.

Core Characteristics of IKS

Indian Knowledge Systems (IKS) are evolving sets of experience and practices co-constructed over many generations by Indigenous peoples in protracted engagement with their local environments. They are complete and comprehensive and include a broad perspective of understanding ecological, cultural, spiritual, social and economic approaches to life.

Here are the core characteristics of Indian Knowledge Systems:

- Holistic and Interconnected: IKS perceives all the aspects of the environment land, water, plants, animals and humans as highly interconnected. It opts to underline the symbiosis between nature and human beings as opposed to viewing nature and human beings as independent entities. It is the commonality of this holistic approach that incorporates various facets of life, such as social, ecological, economic, economic as well as spiritual.
- Local and Context-Specific: IKS is based in a specific local community and its local context. It is acquired over many years of life and co-existence with nature making it much-tuned with the circumstances to suit the environment, the vegetation, and the animals or creatures, as well as the culture.
- Cumulative and Adaptive: Although IKS is transmitted generation-to-generation over time it is not fixed. It is a dynamic system that keeps growing and maturing with variable conditions, new observations and internal/external effects. Indigenous peoples can be seen as scientists in their own ways as they keep testing and innovating their practices.
- Oral Tradition and Experiential Learning: A large volume of the IKS is passed on through the oral tradition hence the stories, songs, folklore, proverbs, myths, rituals and ceremonies. Learning is also experiential, practical, situated in the daily life and in community practice. Elders are very critical as the spokespersons of knowledge.
- Practical and Useful: IKS is highly practical and is used to make decisions about basic aspects of everyday life including agriculture, livestock keeping, hunting, fishing and gathering, animal health practices, traditional medicine, resource management and social arrangement. It offers viable survival techniques and ways of living.
- Embedded in Culture and Worldview: IKS can not be extricated of the context of culture of the Indigenous people. It is represented in the form of language, customs, beliefs, values and rituals and produces a specific worldview which is unlike many Western

epistemologies. Spiritual belief concerning nature tends to affect the management of resources in a number of ways

- Focus on Sustainability and Reciprocity: The management of resources of many IKS focus on sustainability, such that resource sustainability is observed and the future generations are also taken care of. These systems tend to have the idea of reciprocity, and giving back to the land and to the community, as a leading motif.
- Community-based and collective: IKS knowledge Community knowledge is commonly a collective resource and is created and shared by the community. Land, resources and community decisions can be reached through dialogue and consensus among the people.
- Tacit and hard to codify: Tacit knowledge, and much of IKS, are hard to codify or otherwise separate, because they have their origins in experience and are culture-dependent.

Historical Foundations of Indian Knowledge Systems

Indian Knowledge Systems (IKS) has incredibly rich and diverse historical roots and they are extending over the millennium and the number of these disciplines is quite large. They remain firmly embedded in philosophical examination, spiritual knowledge and practical observation and have had far-reaching effects throughout the world.

Here's a breakdown of the key historical foundations:

The Vedic Period (c. 1500 - 500 BCE): The Earliest Foundations

- Vedas as the Source: Vedas are actually the earliest literature books of Indian civilization and the books that make the base of IKS. They are regarded as Shruti (what is heard) signifying that they are revealed.
  - ❖ Rigveda: Divisions of cosmology, philosophy, rituals and ethics.
  - ❖ Samaveda: Chants and melodies which have been called the source of Indian classical music.
  - ❖ Yajurveda: Sacrificial SYTAG and rituals of sacrifices.
  - ❖ Atharvaveda: This is all-inclusive, covering a variety of sciences, such as or example medicine (Ayurveda), military science, economics, and Vedic mathematics as well as charms and spells.
- Upanishads, Brahmanas, Aranyakas: These associated texts also discuss more metaphysics, spiritual knowledge and ritual practices leading to an increasingly more philosophical direction.
- Guru-Shishya Tradition: Teaching-Learning was more oral and learned in a Gurukul- a place where students lived with their gurus (teachers), encouraging a very strong personal relation and all-round growth. The focus was on memorizing, recitals, spiritual development and character development.
- Early Scienctific and Philosophical Thought
  - ❖ Cosmology: Original thoughts on universe and how it came into being.
  - ❖ Ethics and Morality: Concepts of righteousness living.
  - ❖ Simple science: Required to perform the rituals, also came in handy in the process of constructing.

978-93-95659-89-5

Post-Vedic Period and the Rise of Philosophical Schools (c. 600 BCE onwards)

- Programming of the Various Disciplines: A major growth and organization of the knowledge in diverse fields was witnessed during this period.
- Darshanas (Schools of Philosophy) The Indian philosophy can be broadly divided in two streams:
- Astika (Orthodox): Schools which believe in the authority of the Vedas.
- Samkhya: A category of dualistic philosophy that focuses on purusha (consciousness) and prakriti (matter).
- Yoga: Body and mind training means of self realization, based on Samkhya. The Yoga Sutras of Patanjali form the doctrines on which yoga is based.
- Nyaya: School of logic and epistemology, which focuses on the right means of knowledge (perception, inference, comparison, testimony).
- Vaisheshika: An atomistic and pluralistic school of thought which assumes that the universe exists in terms of a limited number of atoms. It heralded the advent of physics in India.
- Mimamsa (Purva Mimamsa): Is concerned with the meaning of Vedic practices and obligations, action and dharma.
- Vedanta (Uttara Mimamsa): Over-focuses on the philosophical doctrine of the Upanishads going in to the nature of Brahman (ultimate reality) and Atman (individual soul). Later sub-schools such as Advaita (Shankara), Vishishtadvaita (Ramanuja) and Dvaita (Madhvacharya) were developed.
- Nastika (Heterodox) Schools: Do not accept the authority of the Vedas.
- Buddhism: Started by Siddhartha Gautama, the focus of Buddhism was the Four Noble Truths and the Eightfold Path of escape to suffering.
- Jainism: Jainism was founded by Mahavira and focused on non-violence (ahimsa), asceticism and anekantavada (multiple viewpoints of reality).
- Charvaka (Lokayata): An atheistic school, materialistic in its outlook, which believed that the supernatural does not exist and knowledge should be based on sensory information.
- Puranas and Epics: The Ramayana and Mahabharata (including the Bhagavad Gita) are not only epic accounts but also sources of moral, ethical and philosophical advice, leveling complex beliefs so that they could reach the people. Puranas are full of cultural, historical and mythological literature.

Flourishing of Sciences, Mathematics, and Arts (Gupta Period and beyond)

- Ancient India achieved numerous contributions in mathematics, which transformed world mathematics.
  - ❖ Decimal Place-Value and Zero: The invention of recent place-value number system, sometimes known as the decimal system as well as the concept of a number having its own value-zero took place in India and later on was introduced to the Islamic world and to Europe.
  - ❖ Aryabhata (5 th century CE): The man who made a change in astronomy and mathematics. Put forward the ideas of the rotation and revolution of the earth, Pi to

four decimal places was calculated, trigonometric values of sine, cosine were developed and hand in hand with algebra.
    - ❖ Brahmagupta (7th century CE): Gave the definition of zero as a number, and a set of rules to deal with negative numbers and arithmetic operations involving zero.
    - ❖ Bhaskaraacharya (12 th century): Drastic algebra, arithmetic and calculus (component of differential calculus).
    - ❖ Sulbasutras (c. 800-500 BCE): Early geometric treatises on how to construct an altar: with knowledge of pythagorean triples and transformation of shapes.
- Astronomy: Complex system of models were made which tried to determine the movements of heavenly bodies.
    - ❖ Aryabhata and Varahamihira (6th century CE): The astronomers who were able to calculate the position of planets, explain eclipses of the moon, and sun and estimate the circumference of the earth.
- Medicine (Ayurveda): This is a complete system of Natural healing with origins in the Atharvaveda.
    - ❖ Charaka Samhita (c. 2nd -century CE): Internal medicine.
    - ❖ Sushruta Samhita (c. 4 th century CE): It deals with surgery, elaborate descriptions of complicated procedures and surgical instruments are found.
- Languages and Grammar:
    - ❖ Ashtadhyayi(Ashtadhyayi) (5th-4th century BCE): A renowned treatise in Sanskrit grammar, and one of the most scientific grammars to have been composed ever.
- Architecture and Urban Planning: Evidence such as Mohenjo-Daro, Harappa, built in the Indus Valley Civilization testify to advanced town planning, water management, and elaborate architecture. Other developments were witnessed in the later periods where the various styles of temple architecture were developed.
- Arts and Literature: The classical dances forms, classical music and drama (e.g. Popular plays by Kalidasa) and a huge volume of poetry and prose works evolved in Sanskrit and local languages.

Institutionalized Learning

- Ancient Universities: India has produced some of the ancient university centers of learning that attracted scholars and students all over Asia.
    - ❖ Later (c. 600 BCE): Takshashila, a school with a wide set of disciplines, including medicine, law, military science and arts.
    - ❖ Nalanda (c. 5th century CE): A world-renowned center of Buddhist studies, whose institutional library (Dharmaganja) hosted a large number of texts on diverse topics, among them Vedas, fine arts, medicine and mathematics, astronomy.
    - ❖ Other prominant centers of learning Vikramashila and Valabhi.
- Preservation of Knowledge: Manuscript was preserved very carefully on the palm leaves and birch bark found in temples, monasteries and individual collections. The development of scripts such as Brahmi, Kharosthi and eventually Devanagari played an imperative role in the recording of knowledge.

The ancient roots of Indian Knowledge Systems present a formidable tradition of thought marked by a philosophical depth of thought and scientific thought based on attention to sensory

978-93-95659-89-5

detail, and a comprehensive connectedness to life and life study. Dealing with the dips in the growth and external pressure, the fundamental values and contributions of IKS proved to be an inexhaustible source of encouragement and the ones that stay relevant in modern discussion.

Relevance of IKS in Modern Education

Indian Knowledge Systems (IKS) have nowadays become particularly relevant to contemporary education with special attention being paid to it in the document of the National Education Policy (NEP) 2020 in India. Incorporation of IKS is regarded as one method towards making education more holistic, culture-based and globally attuned education.
Here's a breakdown of its relevance:

Holistic Development

- **Beyond Rote Learning:** IKS promotes an integrated approach to learning that goes beyond mere rote memorization. It emphasizes the development of the cognitive, emotional, social, and spiritual aspects of an individual.
- **Well-rounded Individuals:** Practices like Yoga and Ayurveda, integral to IKS, contribute to mental and physical well-being, stress management, and emotional balance, which are crucial for students' overall development in today's demanding world.
- **Character Building and Ethics:** IKS is deeply embedded with ethical values, moral principles, and a sense of social responsibility. Integrating these can help instill empathy, integrity, respect for others, and a democratic spirit in students, addressing the erosion of values often lamented in modern society.

Cultural Preservation and Identity:

- **Connecting with Roots:** Modern education, sometimes perceived as overly Westernized, can disconnect students from their cultural heritage. IKS helps students reconnect with India's rich history, traditions, and intellectual achievements, fostering a strong sense of cultural pride and identity.
- **Appreciation of Heritage:** Learning about ancient Indian contributions in various fields (mathematics, science, medicine, arts, philosophy) can instill a sense of pride and inspire students to explore and contribute to their own cultural legacy.
- **Language Preservation:** Many IKS texts are in Sanskrit and other regional languages. Integrating IKS can promote multilingualism and the study of these languages, thereby preserving them and unlocking vast repositories of knowledge.

Interdisciplinary and Critical Thinking:

- **Breaking Silos:** IKS inherently promotes interdisciplinary learning, as ancient Indian disciplines were often interconnected (e.g., Ayurveda with biology and chemistry, astronomy with mathematics). This can help break down artificial disciplinary boundaries in modern curricula.
- **Diverse Perspectives:** IKS offers alternative ways of thinking and problem-solving, providing students with cognitive diversity and enhancing their critical thinking skills by exposing them to different epistemologies.

- **Inquiry-Based Learning:** Traditional Indian pedagogical approaches often encouraged inquiry (*vichara*), debate (*shastrartha*), and reflection, which are vital for fostering critical thinking and analytical abilities in students.

Sustainability and Environmental Consciousness:

- **Ancient Wisdom for Modern Challenges:** Many aspects of IKS, particularly in areas like traditional agriculture, water management, and resource conservation, emphasize sustainable practices and living in harmony with nature. This ancient wisdom offers valuable insights for addressing contemporary global challenges like climate change and environmental degradation.
- **Ecological Stewardship:** Incorporating traditional ecological knowledge can foster a deeper understanding of sustainable practices and inspire eco-consciousness in students.

4.5. Innovation and Problem-Solving:

- **Drawing from Past Solutions:** IKS contains numerous ingenious solutions to problems faced by ancient societies (e.g., in architecture, metallurgy, water systems). Studying these can inspire students to think creatively and develop innovative solutions to modern challenges.
- **Practical Application:** IKS often emphasizes hands-on, practical learning and problem-solving, aligning with modern theories of experiential education and preparing students for real-world applications.

Relevance to National Education Policy (NEP) 2020:

- **Core Mandate:** The NEP 2020 explicitly advocates for the integration of IKS into the curriculum at all levels of education (school and higher education).
- **Vision for "Vishwaguru":** The policy aims to position India as a "Vishwaguru" (global teacher) and believes that leveraging India's rich knowledge heritage is crucial for achieving this.
- **Research and Documentation:** The NEP encourages research, documentation, and digitization of IKS to make it more accessible and to promote further studies. The AICTE has established an Indian Knowledge System (IKS) Division to further these goals.

Examples of IKS Integration in Modern Education

- **Vedic Mathematics:** Introduced as a supplementary module to offer alternative, often simpler, methods for mathematical calculations.
- **Yoga and Meditation:** Incorporated into physical education and wellness programs for holistic health and mental well-being.
- **Ayurveda:** Principles and basic concepts of Ayurvedic health and lifestyle are being introduced, sometimes in conjunction with modern biology or health sciences.
- **Traditional Arts and Crafts:** Encouraging hands-on workshops, field visits to artisan communities, and integrating them into design and vocational education.
- **Ancient Indian Texts:** Using stories from epics like the Ramayana and Mahabharata to teach ethics, moral philosophy, and history.
- **Linguistics:** Studying Panini's grammar as a foundational text in linguistics.

978-93-95659-89-5

- **Environmental Studies:** Incorporating traditional ecological knowledge, water harvesting techniques, and sustainable agricultural practices.

While there are challenges in effective integration (like curriculum rigidities, lack of trained faculty, and authentic resources), the relevance of IKS in fostering a more comprehensive, culturally sensitive, and future-ready education system is increasingly recognized and acted upon in India.

Domains of Indian Knowledge Systems for Education

Language, Literature and Grammar

- Reviving classical languages like **Sanskrit, Pali, Tamil, Prakrit**
- Literary texts conveying moral, philosophical, and cultural values

Philosophy and Logic

- Six classical schools of Indian philosophy (Darshanas)
- Debate and dialogue (e.g., *Shastrartha*) as teaching tools

Health Sciences: Ayurveda and Yoga

- Preventive and curative health practices
- Mental well-being and lifestyle management

Environmental Knowledge and Ecology

- Traditional water management (stepwells, tanks)
- Sustainable agriculture and herbal knowledge

Mathematics and Astronomy

- Algebra, trigonometry, arithmetic, calendar systems
- Instruments like **astrolabes**, **Yantras**, and observatories (e.g., Jantar Mantar)

Arts, Architecture, and Aesthetics

- Classical dance, music, sculpture, and temple architecture
- Natya Shastra, Raga theory, iconography

Pedagogical Strategies for Integrating IKS

Curriculum Development

- IKS content in school textbooks
- Project-based learning on local knowledge

Language and Medium of Instruction

- Promoting mother tongue and regional languages
- Bilingual/multilingual education models

Training and Capacity Building

- Teacher orientation programs on IKS
- Certification programs in Ayurveda, Yoga, Sanskrit

Technology and Digital Repositories

- Digitization of manuscripts and oral histories
- MOOCs and e-learning modules on IKS

Case Studies and Implementation Models

IITs and IKS Centers

- IIT Kharagpur and IIT Bombay have set up IKS cells
- Research on ancient metallurgy, architecture, and computational logic

School Education Initiatives

- NCERT's integration of IKS in textbooks
- State curriculum boards (e.g., Karnataka, Kerala) including folklore, traditions

University-Level Programs

- Institutions like BHU and IGNCA offering degrees and diplomas in traditional knowledge

Challenges in Mainstreaming IKS

Lack of Documentation

- Much of IKS is oral and community-based
- Limited modern research and empirical validation

Academic Resistance

- Colonial hangover leading to dismissal of traditional knowledge
- Perception of IKS as unscientific or outdated

Integration Without Dilution

- Need to retain authenticity while aligning with contemporary curricula

Recommendations and Way Forward

- **Policy Support**: Funding, research fellowships, and interdisciplinary programs
- **Teacher Training**: Develop modules to equip teachers with IKS pedagogies
- **Community Involvement**: Collaboration with artisans, farmers, and healers
- **International Collaboration**: Promote IKS in global academic discourse

Conclusion

Millennia of interaction has grown Indian Knowledge Systems (IKS) into a complex, varied and rich intellectual legacy. They are originals of dynamic and eternal wisdom still applicable today in solving the social, educational, and environmental challenges in the world today; they cannot be antiques.

The cultural self-confidence, ethical values, ecological practices, and intellectual diversity of future generations can all be promoted by appropriately bringing IKS into the formal education system. In this aspect, the NEP 2020 provisions of comprehensive and transdisciplinary as well as value-based education are aligned to the same.

The challenge is seen as providing new depth, perspectives and insights to the existing frameworks as opposed to replacing existing systems of traditional scientific and technical knowledge. Education can also be locally based and globally competitive with well balanced integration, that will make students capable of managing modern challenges as well as remaining connected to their natural and cultural origin.

On the one hand, the strategy of incorporating IKS into modern education will help produce a more sustainable, inclusive, and enlightened future, on the other hand, it would help preserve the history of India.

References

1. Government of India. *National Education Policy 2020*. Ministry of Education, 2020. https://www.education.gov.in/nep.
2. Kapur, R. *Indian Knowledge Systems: Perspectives and Prospects*. Concept Publishing Company, 2021.

978-93-95659-89-5

3. Kashyap, R. *Exploring Indian Knowledge Systems: Tradition, Culture and Modernity*. DK Printworld, 2019.
4. Mukherjee, S., and S. Awasthi. "Integrating Indian Knowledge Systems in Higher Education: Challenges and Opportunities." *Journal of Indian Education*, vol. 48, no. 2, 2022, pp. 12–28.
5. Rangan, R. V., and H. Nagendra. "Traditional Ecological Knowledge and Sustainability in India." *Current Science*, vol. 114, no. 4, 2018, pp. 722–730.
6. Subbarayappa, B. V. "Science in Ancient India." *A Concise History of Science in India*, Indian National Science Academy, 2001, pp. 1–22.
7. UNESCO. *Knowledge Systems and Sustainable Development*. UNESCO Publishing, 2017.

978-93-95659-89-5