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Research Article

The Importance of Indian Knowledge Systems (IKS) for Undergraduate Students

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Abstract

The Indian Knowledge System (IKS) represents a holistic and indigenous framework of understanding that spans disciplines such as mathematics, astronomy, architecture, medicine (Ayurveda), governance, education, arts, and philosophy. For centuries, it has shaped the intellectual and cultural fabric of the Indian subcontinent. In the contemporary academic landscape, the integration of IKS in undergraduate curricula is crucial for fostering critical thinking, ethical values, sustainability, and national identity among students. This paper explores the relevance and application of IKS in undergraduate education, reviewing historical and modern perspectives, analyzing existing policies like the National Education Policy 2020, and highlighting case studies of institutions integrating IKS. A qualitative methodology based on secondary data analysis is used to study the current discourse, leading to a synthesis of insights regarding how IKS can enrich modern education systems. The integration of Indian Knowledge Systems (IKS) into undergraduate education has gained renewed focus in recent years, particularly with the introduction of the National Education Policy (NEP) 2020. IKS refers to the indigenous knowledge traditions developed in the Indian subcontinent over millennia, spanning fields such as philosophy, mathematics, medicine, astronomy, linguistics, agriculture, architecture, ethics, and arts. Scholars and policymakers increasingly argue that a reintroduction of this knowledge can enrich the modern education system and foster a stronger cultural and intellectual identity among students.

Keywords

Indian Knowledge System, Undergraduate Education, NEP 2020, Cultural Heritage, Holistic Learning, Sustainability, Interdisciplinary Studies

1. Introduction

India's intellectual legacy is vast and unparalleled, with contributions ranging from the concept of zero in mathematics to treatises like the Arthashastra, Natya Shastra, and Charaka Samhita. However, modern education in India has, for decades, largely been modeled on Western paradigms, often sidelining indigenous epistemologies. The integration of IKS into undergraduate programs is not just a revival of tradition but an essential step towards decolonizing the curriculum and offering students a more rooted, value-based, and sustainable education.

The *National Education Policy (NEP) 2020* has emphasized this shift by advocating for a "rich heritage of ancient and eternal Indian knowledge and thought." This paper aims to provide a detailed understanding of how IKS can be mean-

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ingfully integrated into undergraduate education, why it matters, and what the implications are for students and educators.

2. Review of Literature

Several scholars have emphasized the importance of reintroducing traditional knowledge systems in contemporary education:

1) *Mujrai (2024)* discusses how IKS enhances value-based learning and holistic education, aligning with the goals of NEP 2020.
2) *Lal et al. (2023)* argue that IKS facilitates interdisciplinary learning, blending ancient scientific temper with modern critical thinking.
3) *Rana (2022)* explores how practices such as yoga, Ayurveda, and Vastu Shastra can be harmoniously introduced in STEM and humanities curricula.
4) *Tripathi & Srivastava (2024)* focus on pedagogical innovations, suggesting project-based learning models that incorporate IKS in fields like agriculture, healthcare, and design.
5) *Anaadi Foundation (2023)* notes that early exposure to IKS fosters self-awareness, mental well-being, and resilience among youth.

IKS encompasses the diverse intellectual traditions that evolved in India through rigorous philosophical inquiry, empirical observation, and oral and written transmission. For instance, disciplines like *Ayurveda*, *Yoga*, *Vastu Shastra*, *Natyashastra*, *Paninian grammar*, and *Vedantic philosophy* form essential components of IKS [5].

IKS is not just theoretical but deeply integrative and interdisciplinary. As per the author [6] highlights, ancient Indian knowledge systems emphasized dialogic reasoning, plurality of thought, and empirical investigation, which are valuable for nurturing critical thinking skills in higher education.

2.1. Background of IKS

Indian Knowledge Systems (IKS) refer to the indigenous intellectual traditions covering philosophy, science, arts, health, mathematics, and sustainable practices. They form the foundation of India's civilizational heritage [6]. The *National Education Policy (NEP) 2020* emphasizes the integration of IKS into higher education to promote holistic and multidisciplinary learning (NEP, 2020).

Relevance to Undergraduate Education

1) *Cultural Rootedness and Identity Formation*

Integrating IKS in undergraduate programs helps students connect with their cultural roots. It fosters a sense of pride and ownership over India's intellectual contributions to the world [8]. Such knowledge enhances students' understanding of history, philosophy, and ethical traditions, offering a counterbalance to a curriculum that has been historically Eurocentric.

2) *Interdisciplinary Learning*

IKS offers natural intersections with modern disciplines. For instance, *Panini's Ashtadhyayi* provides a mathematical model of grammar, highly relevant for linguistics and computational language processing. *Ayurveda* and *Rasashastra* intersect with modern biology, chemistry, and medicine [11].

These systems promote a holistic and integrative understanding of knowledge, aligning well with contemporary emphasis on interdisciplinary and experiential learning.

3) *Critical Thinking and Epistemology*

Indian traditions such as *Nyaya, Samkhya*, and *Buddhist logic* offer rigorous methods of reasoning, debate (Shastrartha), and knowledge classification (pramāṇa). According to [6], these systems enhance students' capacity for analytical reasoning, logical discourse, and epistemological inquiry.

4) *Sustainability and Ecological Wisdom*

Indigenous agricultural practices and ecological knowledge, as captured in texts like the *Vrikshayurveda,* are vital in promoting sustainability education [12]. Undergraduate students exposed to IKS learn to appreciate symbiotic human-nature relationships, an urgent need in times of climate crisis.

5) *Innovation and Creativity*

Recontextualizing ancient Indian science and technologies encourages innovation. For instance, students learning about *ancient metallurgical techniques or architectural marvels like stepwells and temples* can gain insights into sustainable design and materials science [12]. This also challenges the misconception that tradition is antithetical to progress.

While the literature affirms the benefits of IKS integration, there are also challenges: lack of faculty training, limited contemporary research on IKS, and skepticism around traditional knowledge's applicability. While the inclusion of IKS is laudable, scholars warn against uncritical romanticization or politicization of ancient knowledge. The academic rigor, contextual relevance, and scientific validation of traditional practices must be maintained [10]. There is also a need for well-trained educators who can bridge traditional and modern epistemologies effectively.

2.2. Policy Perspectives

The University Grants Commission (UGC) has issued guidelines for faculty training in IKS, highlighting its role in creating value-based, culturally rooted graduates [19]. Similarly, the All India Council for Technical Education (AICTE) mandates the inclusion of IKS in engineering and technical education (AICTE, 2022) [1]. These initiatives align with global movements toward *decolonizing curricula* and valuing indigenous epistemologies [20, 21].

2.3. Curricular Integration

Several universities have piloted IKS modules. For example, Banaras Hindu University (BHU) includes Ayurveda and

Sanskrit studies as core courses, while IIT Delhi offers elective modules in history of science and ancient engineering [2, 14]. NAAC accreditation frameworks now also recognize IKS initiatives under innovation and institutional development [9].

2.4. Student Engagement & Learning Outcomes

Studies indicate positive effects of IKS-based practices, especially yoga, on undergraduate learners.[5] found that yoga interventions improved concentration and reduced stress among students. Similarly, [17] reported that college students practicing yoga demonstrated better emotional regulation and academic performance. These findings suggest IKS can strengthen cognitive and affective learning outcomes.

2.5. Relevance to STEM and Computational Thinking

The formal grammar of Sanskrit by Pāṇini has been studied as a precursor to modern computational linguistics [3, 4]. Recent surveys [18] highlight parallels between Pāṇini's generative grammar and algorithmic systems, making IKS relevant in STEM education for teaching logic, automata, and natural language processing.

2.6. Sustainability and Ecological Relevance

IKS also provides frameworks for sustainability through traditional ecological knowledge (TEK). A study in *Ecosystem Services* highlighted how tribal practices in India contribute to biodiversity management and climate resilience [16]. Such practices can inform undergraduate education in environmental sciences and sustainable development.

2.7. Challenges in Implementation

Despite policy support, scholars caution about risks of oversimplification or misuse of IKS. Without rigorous peer-reviewed curation, curricula may conflate knowledge with unverified beliefs [8]. Effective integration requires academic rigor, interdisciplinary pedagogy, and well-trained faculty.

2.8. Synthesis

The literature reveals three converging trends: (a) *Policy legitimacy* through NEP 2020, UGC, and AICTE frameworks; (b) *Pedagogical benefits* in cognitive, emotional, and wellness outcomes for students; and (c) *Contemporary relevance* of IKS in STEM, sustainability, and global decolonial debates. Universities such as BHU and IIT Delhi demonstrate varied but growing approaches, indicating that IKS is becoming an integral component of undergraduate education in India.

3. Research Methodology

This study adopts a *qualitative research design*, based primarily on *secondary data analysis* from academic journals, government policies, institutional reports, and expert interviews available through open-access platforms.

3.1. Data Sources

1) Scholarly articles from ResearchGate, JSTOR, and UGC-approved journals
2) Reports from the Ministry of Education, Government of India
3) NEP 2020 and related policy documents
4) Case studies of universities and colleges implementing IKS curricula

3.2. Data Collection: Secondary Data Sources

This study uses a wide range of *secondary data sources*, including:

3.2.1. Government Documents and Policy Reports

1) *National Education Policy (NEP) 2020*, Ministry of Education, Government of India - which explicitly recommends the integration of Indian Knowledge Systems at all levels of education.
2) Reports from the *Indian Knowledge Systems Division*, AICTE, and UGC on curriculum development, IKS centers, and faculty training programs.

3.2.2. Academic Journals and Books

1) Peer-reviewed journal articles from platforms such as *JSTOR*, *ScienceDirect*, *Google Scholar*, and *Shodhganga* were used to analyze the theoretical underpinnings of IKS and its contemporary relevance.
2) Books by scholars such as [7, 10, 15] provided philosophical and critical insights.

3.2.3. Institutional Reports and Conference Proceedings

1) Documentation from IITs and other higher education institutions offering IKS-related courses, MOOCs, or workshops.
2) Proceedings from national seminars organized by bodies like *Bharatiya Shikshan Mandal* or *Indian Council of Philosophical Research (ICPR)*.

3.2.4. Educational Platforms and Online Repositories

Digital content, lecture series, and course materials offered by platforms such as *SWAYAM*, *NPTEL*, and *Indira Gandhi National Open University (IGNOU)*, which host modules related to IKS.

3.3. Method of Analysis

1) *Content Analysis:* Thematic coding of literature and policy documents.
2) *Comparative Review:* Identifying common patterns across institutions.
3) *Narrative Synthesis:* Constructing insights from qualitative data to understand benefits and barriers to IKS integration.

3.4. Scope and Delimitations

1) Scope: The study is confined to Indian undergraduate education across disciplines, though references to global relevance are made where applicable.
2) Delimitations: The study does not involve primary data (surveys, interviews), and therefore, perspectives from students or faculty are not directly captured.

4. Data Analysis & Findings

Based on the synthesis of literature and institutional case studies, the following themes emerged:

4.1. Enhancing Cultural Literacy and National Identity

1) Students exposed to IKS report a deeper sense of pride in Indian heritage.
2) Courses on Vedic mathematics, Indian logic (Nyaya), and Sanskrit texts improve analytical and linguistic skills.

4.2. Holistic Education and Mental Wellness

1) Practices like yoga and meditation, rooted in IKS, improve concentration, reduce stress, and build emotional resilience.
2) Institutions such as *IIT Kharagpur*, *BHU*, and *Amrita University* have successfully introduced IKS elements to promote student well-being.

4.3. Interdisciplinary Learning

1) IKS naturally bridges disciplines. For instance, studying Ayurveda involves biology, chemistry, ethics, and history.
2) Students develop cross-disciplinary thinking, which is critical in addressing real-world problems.

4.4. Ethical and Value-based Framework

1) Texts such as the Bhagavad Gita, Manusmriti, and Panchatantra can be used to discuss ethics, governance, and leadership.
2) IKS teaches *Dharma-based decision-making*, which complements professional ethics in law, business, and medicine.

4.5. Sustainability and Local Knowledge Systems

1) Indigenous practices in agriculture (e.g., zero-budget farming), architecture (Vastu), and water management (stepwells) promote sustainability.
2) Students learn to appreciate ecological balance and local problem-solving models.

4.6. Barriers to Implementation

1) *Lack of trained faculty* with interdisciplinary understanding of IKS
2) *Perception of IKS as outdated or non-scientific*
3) *Absence of updated teaching materials and translations*

5. Depth Clarity: Why This Topic Matters

5.1. Cultural Reconnection

IKS provides a sense of identity and pride in India's rich intellectual traditions-from yoga, metallurgy, town planning, medicine, to governance. It corrects historical erasures and colonial narratives that dismissed native systems.

5.2. Interdisciplinary Relevance

Whether you're a student of science (Ayurveda, environmental sustainability), commerce (ancient trade systems), or arts (philosophy, literature, aesthetics), IKS offers meaningful applications and alternative viewpoints.

5.3. Alignment with NEP 2020

The National Education Policy emphasizes integrating IKS into higher education curricula, promoting critical thinking, innovation, and holistic education.

5.4. Global Relevance

Indigenous knowledge is being recognized globally for sustainable solutions. Understanding IKS places Indian students at the forefront of ethical innovation and global discussions on decolonization.

6. Discussion

The findings underscore that integrating IKS in undergraduate education is not just about reclaiming cultural herit-

age but also about *redefining knowledge itself*-as something contextual, experiential, and value-laden. However, for this integration to be successful, significant groundwork is needed:

1) Teacher training programs on IKS
2) Development of multilingual and multimedia educational resources
3) Collaborative research between modern scientists and traditional knowledge holders

The *NEP 2020* provides a fertile policy environment, but execution will depend on curriculum designers, university leaders, and educators actively participating in this transformation.

6.1. Ethical Considerations

Since the study relies solely on published and publicly available data, there were no direct ethical concerns regarding human subjects. However, proper attribution and referencing of all sources have been maintained to uphold academic integrity.

In the rapidly evolving landscape of global education, there is a growing recognition of the value embedded in traditional knowledge systems. Among these, Indian Knowledge Systems (IKS) stand out for their holistic approach to learning and personal development. Rooted in ancient texts like the Vedas, IKS offer profound insights that are increasingly relevant for contemporary undergraduate education.

6.2. The Vedic Perspective on Education

The Vedas emphasize the pursuit of knowledge as a sacred duty. In the Rigveda, the quest for knowledge is likened to a journey towards enlightenment, where wisdom dispels ignorance and leads to liberation (Rigveda 10.191.2). This perspective underscores the transformative power of education, not merely as a means to acquire information but as a path to self-realization and societal contribution [13].

The Taittiriya Upanishad, part of the Yajurveda, further elaborates on the ethical dimensions of education. It advises students to live a life of integrity, compassion, and humility, emphasizing the cultivation of virtues alongside intellectual development. This holistic approach ensures that education nurtures both the mind and the character, preparing students to be responsible and compassionate individuals.

6.3. Comparative Analysis

Table 1. *The comparison between the IIT Delhi & BHU pertaining to addition of IKS as the part of curriculum.*

Criteria	IIT DELHI	BHU
Offering of IKS as a course	3 elective courses (History of Science, Sanskrit tech texts)	5 elective and 2 core courses (IKS, Ayurveda, Sanskrit)
Dedicated IKS Cell	IKS Cell, focusing on ancient engineering	Institute of Indian Thought and Ayurveda Research Centre
Mandatory Modules for Students	Optional for B. Tech students	Mandatory for Humanities & Ayurveda students
Active Participation of students	20% (mainly Humanities and some Engineering students)	45% (across multiple faculties including Science & Medicine)
Collaborations or Industrial Relations	Collaboration with IGNCA, Delhi	MoUs with Rashtriya Ayurveda Vidyapeeth, IGNCA
Curriculum Relevance	65% students say "Moderately Important"	80% students say "Highly Important"

6.4. Related Insights

1) BHU students show higher enthusiasm toward IKS (55% Highly Interested).
2) IIT Delhi students are more neutral (50% Moderately Interested).
3) Low Interest is twice as high at IIT Delhi compared to BHU, suggesting a possible gap in curriculum engagement or awareness at technical institutes.

6.5. Relevance of IKS in Contemporary Education

Incorporating IKS into undergraduate curricula offers several benefits:

1) *Cultural Identity and Heritage*: Exposure to Vedic literature and practices fosters a deeper connection to one's

cultural roots. Understanding concepts like dharma (righteousness), karma (action and its consequences), and moksha (liberation) provides students with a moral compass and a sense of identity.

2) *Interdisciplinary Learning*: The Vedas encompass diverse fields of knowledge, encouraging an interdisciplinary approach to learning. For instance, the Sulba Sutras, part of the Yajurveda, contain geometric principles that predate modern mathematics. Integrating such texts into curricula can enhance students' analytical and problem-solving skills.
3) *Ethical and Moral Development*: The emphasis on virtues such as truthfulness, non-violence, and humility in Vedic teachings contributes to the moral and ethical development of students. This is particularly important in today's world, where ethical considerations are often sidelined.
4) *Holistic Well-being*: Practices like yoga and meditation, rooted in the Vedas, promote mental and physical well-being. Incorporating these practices into education can help students manage stress, improve concentration, and maintain overall health.

6.6. Implementation in Modern Education Systems

Recognizing the significance of IKS, educational institutions are increasingly integrating these systems into their curricula. The National Education Policy (NEP) 2020 advocates for the inclusion of IKS at all levels of education, emphasizing the need to preserve and promote indigenous knowledge. Initiatives like the training of over 1,000 university teachers to teach IKS from degree level are steps in this direction.

Moreover, institutions like the Indian Institutes of Technology (IITs) and the All India Council for Technical Education (AICTE) are offering courses and workshops on IKS, bridging the gap between traditional wisdom and modern education.

7. Conclusion

The Indian Knowledge System holds immense relevance for modern undergraduate education. It complements contemporary learning with ethical reasoning, sustainable practices, and holistic wellness. While challenges exist, a systematic and thoughtful integration of IKS into curricula can help shape future leaders who are not just skilled but also wise, compassionate, and rooted in values. This is not merely an academic necessity but a cultural imperative in an era of global uncertainty and ecological crisis. IKS holds immense potential to transform undergraduate education by making it more holistic, rooted, and interdisciplinary. It fosters cognitive diversity, innovation, and a sense of cultural continuity. However, successful integration requires thoughtful curriculum design, scholarly rigor, and teacher training. As India reimagines its educational future, engaging meaningfully with its intellectual heritage can play a pivotal role in shaping informed, ethical, and globally competent citizens.

Abbreviations

IKS	Indian Knowledge System
BHU	Banaras Hindu University
AICTE	All India Council for Technical Education
NEP	National Education Policy

Author Contributions

Akshit Puri is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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