A Report on the Proceedings of

Workshop on Developing Content on Bhartiya Gyan Parampara (Indian Knowledge System – IKS)

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Organised by

Department of Physics
Kurukshetra University, Kurukshetra

and

Haryana State Higher Education Council, Panchkula

Preface

The integration of **Bhartiya Gyan Parampara** (Indian Knowledge System – IKS) into contemporary academia marks a crucial progress in higher education across India. Rooted in millennia of rigorous observation, formal logic, algorithmic thinking, and empirical analysis, the IKS offers a rich repository of interdisciplinary wisdom that complements and enhances modern scientific discourse.

This report brings together the key insights, scholarly presentations, and academic frameworks delivered during the One-day Workshop on Developing Content on Bhartiya Gyan Parampara (Indian Knowledge System-IKS) in the subjects of Physics, Mathematics, Computer Science, Botany, and Home Science, hosted at Kurukshetra University on August 05, 2026. This workshop served as a collaborative platform for educators, researchers, and administrators to address a critical objective: translating India's vast computational, physical, mathematical, botanical, and home science heritage into structured, contemporary academic curricula and content.

Through technical sessions led by eminent scholars and a representative from the Ministry of Education's IKS Division, the workshop mapped out both theoretical foundations and practical implementation strategies. Emphasis was placed on demystifying ancient Indian methodologies—such as Pāṇinian generative linguistics, algorithmic matrix constructions (*bhadragaṇita*), and traditional ecological wisdom—by connecting them directly to modern disciplines including Computer Science, Physics, Mathematics, Botany, and Home Science.

We extend our sincere gratitude to the leadership of Kurukshetra University, Kurukshetra and the Haryana State Higher Education Council, Panchkula, the esteemed speakers, technical sessions chairs, and participants whose contributions made this workshop a significant milestone in content development for IKS.

Contents

Executive Summary	1
Inaugural Session	1-3
TECHNICAL SESSION I (*Plenary*)	4-6
Indian Knowledge Systems: Relevance in the Present Context Speaker: Prof. Pawan Kumar Sharma, Pro Vice Chancellor, Central University of Haryana, Mahendergarh	4
Schemes of GOI to Promote IKS Speaker: Dr. Pijus Kanti Pal, Assistant Coordinator, IKS Division, Ministry of Education, Delhi	5
TECHNICAL SESSION II (*Plenary)*	6-7
Computational Heritage of India Speaker: Prof. Rakesh Kumar, Dean Academic Affairs, Department of Computer Science & Applications, Kurukshetra University, Kurukshetra	6
TECHNICAL SESSION III(A) (*Parallel)*	7-10
A Holistic Framework: Analyzing Indian Knowledge Systems in the Realm of Physics Speaker: Prof. Sunita Shrivastava, Central University of Haryana, Mahendergarh	7
Developing Content on Indian Knowledge Systems (IKS) in Mathematics Speaker: Prof. S. K. Tomar, Department of Mathematics, Panjab University, Chandigarh	8
TECHNICAL SESSION III(B) *(Parallel)*	10-12
Realm of Botany: From Ancient Wisdom to Modern Science Speaker: Prof. Anand Narain Singh, Department of Botany, Panjab University, Chandigarh	10
Home Science Through the lens of Indian Knowledge System: Preserving Heritage, Promoting Innovation Speaker: Prof. Beenu Tanwar, BPSMV, Khanpur Kalan	11
Valedictory Session	12

Executive Summary

On August 05, 2026, Kurukshetra University conducted a workshop focused on developing content on Bhartiya Gyan Parampara (Indian Knowledge System- IKS). The program convened subject matter experts across faculties of physical and life sciences to establish frameworks for integrating classical Indian knowledge into standard undergraduate and postgraduate curricula in line with the National Education Policy (NEP) 2020 and to develop authentic content for the same.

The technical sessions focused on aligning curricula with the NEP 2020, and the participating faculty members were also apprised about institutional schemes, research grants, and funding models supported by the Ministry of Education's IKS Division. The technical sessions further highlighted the contemporary relevance of IKS, framing it as an active component rather than a purely historical study. Presentations highlighted India's rich history of algorithmic thinking, referencing Pāṇini's rule-based generative grammars and Nārāyaṇa Paṇḍita's work on matrices, modular arithmetic, and constraint-satisfaction problems. Domain-specific technical sessions further explored pedagogical modules in physics, mathematics, traditional plant taxonomy, ethnobotany, and sustainable living practices.

To implement these ideas effectively, the workshop outlined core recommendations centered on modular course design, text digitization, and cross-disciplinary collaboration. Faculty members were encouraged to initially design unit-level modules that pair traditional techniques with modern coursework, translate classical primary texts into pseudocode and contemporary scientific terminology, and build interdisciplinary research clusters to publish peer-reviewed teaching materials.

Inaugural Session



The inaugural session of the State-level Workshop on Developing Content on Bhartiya Gyan Parampara (Indian Knowledge System -IKS) emphasized on establishing a robust framework for integrating indigenous Indian knowledge into undergraduate and postgraduate curricula. Focused on five key disciplines—Physics, Computer Science, Mathematics, Botany, and Home Science—the workshop brought

together academic leaders, subject matter experts, and faculty members from across Haryana to design and develop evidence-based, authentic, and multidisciplinary educational materials aligned with the NEP 2020 and the relevant UGC guidelines.

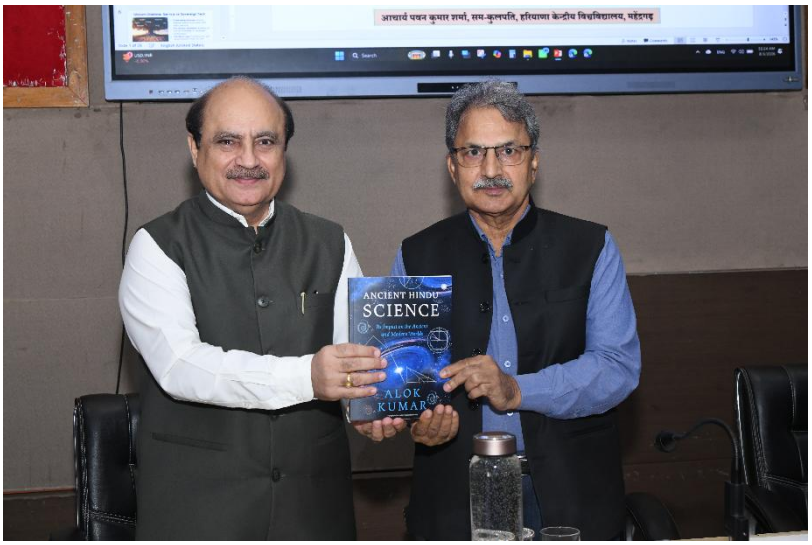
The inaugural session commenced with the auspicious lighting of the lamp and Saraswati Vandana, creating a reflective and reverent tone for the day's discussions. Prof. Rajesh Kharab delivered the formal welcome address, greeting distinguished guests and participants.

Prof. R. K. Moudgil, Workshop Co-ordinator, set the tone for the event by addressing the absence of India's intellectual heritage in modern curricula. Illustrating this through a student's anecdote on the perceived western dominance in physics, he emphasized the need to acknowledge Indian contributions across mathematics, astronomy, metallurgy, architecture, and medicine—citing Albert Einstein's tribute to Indian mathematical foundations. He appreciated the enthusiasm shown by faculty members in developing content on IKS, highlighting participation from almost all parts of the Haryana state. He concluded by outlining the day's agenda, which included two plenary sessions and two parallel technical sessions, one each for physical and life sciences.



Prof. Kailash Chandra Sharma, Chairperson of the Haryana State Higher Education Council (HSHEC) and the Chief Guest of the event, outlined the policy, philosophical foundations, and roadmap for embedding the IKS into modern education curricula. He asserted that true alignment with NEP 2020 demands a pedagogical overhaul that weaves Indian perspectives directly into core subject curricula rather than relying on standalone elective courses on IKS. Drawing on the philosophical framework of *Purushartha*, he contrasted consumption-driven materialism with a balanced worldview where economic pursuit (*Artha*) is grounded in ethics (*Dharma*), sustainability, and harmony with nature. To achieve practical integration, Prof. Sharma advocated for experiential learning through visits to heritage and archaeological sites like Rakhigarhi and Chittorgarh, multidisciplinary collaboration across disciplines, rigorous

validation of ancient scientific claims using original textual citations such as the *Aryabhatiya*, and instructional footnotes in textbooks to guide educators. He also underscored the HSHEC's proactive steps, notably a three-month faculty mentored student internship program dedicated to developing validated IKS educational content.



Presiding over the inaugural function, Prof. Somnath Sachdeva, Vice-Chancellor of Kurukshetra University, presented an institutional roadmap to synthesize traditional Indian Knowledge Systems (IKS) with modern science under the ethos of "Sa Vidya Ya Vimuktaye". To operationalize this vision, he underlined that Kurukshetra University is deploying a four-tier framework comprising 17 value-added foundational courses, specialized programs in Yoga and the Bhagavad Gita, mainstream integration across the faculties of arts and sciences, and mandatory references to authentic classical Indian treatises in doctoral research. This model bridges historical insights with contemporary disciplines—linking Paninian linguistics to computational linguistics and AI, ancient mathematics to physics, and Ayurvedic concepts to botany and environmental science. Throughout, curriculum development is anchored in empirical rigor, practical relevance, and an active dialogue between ancient frameworks and modern scientific paradigms.



The dignitaries encouraged the participating faculty members to commence the process of subject-wise integration of IKS into curricula and module drafting.

TECHNICAL SESSION I (First Talk): **Indian Knowledge Systems: Relevance in the Present Context** (*Plenary)*

Speaker: Prof. Pawan Kumar Sharma, Pro Vice Chancellor, Central University of Haryana, Mahendergarh

Moderator: Prof. Manjula Chaudhary, Kurukshetra University, Kurukshetra

In his talk on "Indian Knowledge Systems: Relevance in the Present Context," Prof. Pawan Kumar Sharma emphasized the vital need to bridge modern education with India's rich intellectual heritage. Historically, India served as a global epicentre of innovation, science, and trade— accounting for nearly one-third of the world's economy in ancient times, and even around the year 1700 its share remained approximately one-fourth of the global economy. Prof. Sharma attributed the subsequent economic and intellectual decline to colonial-era education policies, which replaced indigenous systems with an administrative curriculum designed to foster compliance rather than independent innovation, critical thinking, or cultural connection.

To reverse this intellectual dependence, the objective is not to discard modern advancements, but to integrate Indian Knowledge Systems (IKS) meaningfully across standard disciplines, including STEM fields, medicine, management, and the humanities. Moving beyond the passive consumption of technology, India must cultivate indigenous research and problem-solving methodologies to become an active creator of knowledge. Prof. Sharma highlighted that true education transcends rote learning and examination scores; it is "lived knowledge" that transforms ethical conduct, character, and societal responsibility.



This holistic philosophy is rooted in the classical Indian classification of *Gyan*: Apara Vidya (empirical and worldly sciences) and Para Vidya (higher spiritual and ethical knowledge). While contemporary education excels in material and technical prowess, it requires the moral, philosophical, and self-reflective foundations of traditional wisdom to address modern crises, from mental health to environmental sustainability and technological ethics.

Crucially, Prof. Sharma cautioned against uncritical romanticization of the past. The revival of IKS must rely on logical reasoning, textual authenticity, and rigorous scientific validation to command global credibility. By synthesizing the analytical precision of modern science with the ethical, sustainable, and holistic principles of the *Bharatiya Gyan Parampara*, educational institutions can nurture capable professionals who are also grounded, ethical, and forward-looking global citizens.

TECHNICAL SESSION I (Second Talk): **Schemes of GOI to Promote IKS**

Speaker: Dr. Pijus Kanti Pal, Assistant Coordinator, IKS Division, Ministry of Education, Delhi

Moderator: Prof. Manjula Chaudhary, Kurukshetra University, Kurukshetra

Dr. Pijus Kanti Pal, delivered a concise talk on Schemes of Government of India to promote IKS: Funding Opportunities through the Indian Knowledge Systems Division. The session began with an overview of the IKS Division's vision, which centers on promoting interdisciplinary and multidisciplinary research on all aspects of Indian Knowledge Systems while working to preserve and disseminate this knowledge for further research and societal application, encapsulated in the phrase "Bringing IKS from Libraries to Laboratories". Dr. Pal outlined the various funding opportunities available through the division, including IKS Research Centres (up to ₹40 lakh) aimed at higher education institutions, IKS Teacher Training Centres (up to ₹35 lakh), Outcome-based Research Proposals (up to ₹20 lakh) for faculty and researchers, IKS Textbook and Course Material Writing grants (up to ₹15 lakh) for authors and faculty, and IKS Institutional Internships offering ₹10,000 per student per month.



He then discussed the important components required in a strong proposal, emphasizing the concepts of Dṛṣṭi (perspective), Paramparā (tradition), and Laukikaprayojanam (practical utility), alongside the need for a clear outcome, engagement with primary texts and experts, and a well-defined objective and methodology. A key portion of the session was devoted to a brainstorming exercise, in which Dr. Pal illustrated how modern academic subjects such as Physics, Mathematics, Computer Science, Botany, and

Home Science could be reframed through Sanskrit and IKS terminology, drawing connections to classical concepts like Vaiśeṣika philosophy, Śulbasūtra geometry, and Pāṇini's rule-based linguistic systems.

Finally, Dr. Pal presented three potential publication plans under consideration: an overview volume on Indian Knowledge Systems, a broader 20-chapter book titled "Timeless Teachings: Indian Knowledge Systems for Modern Times," and a dedicated preparatory book for the IKS NET examination. He closed by introducing the IKS Textbook Writing Framework and many ongoing research themes of the IKS Division, spanning areas such as Vedic Philosophical and Cognitive Sciences, Historical and Civilizational Sciences, Mathematical, Physical and Astronomical Sciences, and Medical and Health Sciences.

TECHNICAL SESSION II: **Computational Heritage of India** (*Plenary)*

Speaker: Prof. Rakesh Kumar, Dean Academic Affairs, Department of Computer Science & Applications, Kurukshetra University, Kurukshetra

Moderator: Prof. Sanjeev Aggarwal, Dean Research and Development, Kurukshetra University, Kurukshetra

A session on "Computational Heritage of India" was delivered by Prof. Rakesh Kumar,



highlighting the rich computational concepts embedded within the Indian Knowledge System (IKS). It was emphasized that ancient Indian scholars, while working in disciplines such as mathematics, astronomy, linguistics, logic, and philosophy, developed ideas that closely resemble modern computational thinking and computer science concepts. The session began by illustrating how knowledge created in one discipline can significantly influence another. Using the example of Noam Chomsky's work on formal grammars and its impact on compiler design and programming languages, the speaker motivated participants to identify computational abstractions hidden within ancient Indian texts.

Prof. Kumar presented the contributions of eminent Indian scholars such as Pingala, Aryabhata, Brahmagupta, Mahāvīra, Bhāskaracharya, and the Kerala School, explaining their pioneering work in binary representation, combinatorics, positional arithmetic, algebra, numerical

methods, and algorithmic procedures. He demonstrated how these contributions form the foundation of several modern computational concepts.

A major focus of the session was on algorithmic thinking, including decomposition, sequencing, decision-making, repetition, and optimization. Prof. Kumar explained these concepts through the construction of the Magic Square, showing how ancient mathematical techniques naturally incorporate algorithm design, iteration, conditional logic, modular arithmetic, and constraint satisfaction problems. Participants gained practical insights into how traditional methods can be interpreted using modern programming concepts. The session concluded with a discussion on semantic networks and the importance of connecting concepts from Indian Knowledge Systems with contemporary computer science education. Prof. Kumar encouraged educators to build these conceptual links so that India's computational heritage becomes an integral part of modern learning and research.

Overall, the session was highly informative and thought-provoking. It successfully demonstrated the relevance of India's ancient knowledge traditions in the context of modern computational thinking, inspiring participants to explore interdisciplinary research and appreciate the historical foundations of computer science.

TECHNICAL SESSION III-A (First Talk): **A Holistic Framework: Analyzing Indian Knowledge Systems in the Realm of Physics** (*Parallel)*

Speaker: Prof. Sunita Shrivastava, Department of Physics, Central University of Haryana, Mahendergarh

Moderator: Prof. Sanjeev Aggarwal, Dean Research and Development, Kurukshetra University, Kurukshetra

Prof. Sunita Shrivastava gave a comprehensive talk that made people think about how Indian knowledge traditions connect to the development of physical sciences. She started by talking about “Parampara”, an idea of knowledge as a living tradition, making the point that IKS is not something separate from society, but is woven right into India's culture, philosophy, education, and scientific history. She pointed



that studying IKS properly means going back to authentic historical sources and looking at them with balanced scientific evidence. She expanded her discussion of IKS by pulling examples from the Vedas, Upanishads, and texts like the Arthashastra, Sushruta Samhita, Panchatantra, Aryabhatiya, Siddhanta Shiromani, and the Vaisheshika Sutra. She also pointed to India's contributions in mathematics, astronomy, medicine, metallurgy, calendar keeping, and education, things like the decimal system, predicting eclipses, the astronomical work of Aryabhata and Bhaskaracharya, early understanding of Earth's rotation, the famous rust-resistant Iron Pillar of Delhi, and the Kerala School of Mathematics. The lecture highlighted Maharishi Kanada's philosophy, especially his idea of the Paramanu, or atom. She described how matter was thought to be made of indivisible particles that join to form Dvyanuka and Tryanuka. From there she moved into how ancient Indian thinkers approached motion, mechanics, force, causality, space (Akasha), time, and gravity, and how these ideas fed into both philosophy and scientific reasoning more broadly. She also brought up references to magnets in the Sushruta Samhita and Arthashastra, showing that awareness of magnetism in India goes back a long way.

Further connecting IKS with modern physics by touching on classical mechanics, waves and optics, electromagnetism, and quantum mechanics she brought up C. V. Raman's work on the acoustics of Indian instruments and on light scattering as an example of traditional knowledge feeding into modern research. She drew a clear line between things that are already firmly established, atomic philosophy, mathematical astronomy, trigonometry, eclipse prediction, calendar science etc. Finally, the session wrapped up with a discussion on how IKS could fit into modern science education, and she shared a solid list of primary and secondary references for anyone who wanted to dig deeper. Overall, her talk encouraged faculty members to bring genuine IKS contributions into their teaching and research, while holding on to scientific rigour and historical accuracy.

TECHNICAL SESSION III-A (Second Talk): **Developing Content on Indian Knowledge Systems (IKS) in Mathematics**

Speaker: Prof. S. K. Tomar, Department of Mathematics, Panjab University, Chandigarh

Moderator: Prof. Sanjeev Aggarwal, Dean Research and Development, Kurukshetra University, Kurukshetra

In his expert lecture on "Developing Content on Indian Knowledge Systems (IKS) in Mathematics," Prof. S. K. Tomar underscored India’s rich legacy in the exact sciences and urged educators, researchers, and students to build authentic, rigorous academic content

grounded in traditional mathematical treatises. Defining mathematics not merely as computation, but as a universal framework of logic, patterns, and problem-solving foundational to fields from physics to artificial intelligence, Prof. Tomar expressed concern over the relative lack of systematic research on original Sanskrit manuscripts. He emphasized that the goal of IKS is not uncritical historical glorification, but the evidence-based rediscovery and modern scientific validation of ancient mathematical concepts.

To showcase the depth and beauty of India's mathematical heritage, Prof. Tomar highlighted several foundational ideas and numerical curiosities. He discussed Kaprekar's Constant (6174) and the famous Ramanujan Number (1729) alongside the Hardy–Ramanujan anecdote, illustrating deep mathematical intuition. Turning to classical texts, he examined the Śulba Sūtras, demonstrating their sophisticated geometric constructions, figure transformations, and formulations equivalent to the Pythagorean theorem. He also highlighted the legacy of Śrīdhara in formulating systematic procedures for quadratic equations, as well as root-approximation methods derived from Ramanujan's insights, proving that classical Indian algorithms remain relevant to modern numerical analysis and computational techniques.



A key highlight of the address was innovative mathematical pedagogy. Prof. Tomar demonstrated how abstract ideas, such as mathematical mappings and functions, could be intuitively taught using cultural narratives, specifically drawing an analogy from the *Mahabharata* involving the relationship between Nakul and Sahadeva. This demonstrated how Indian cultural contexts can make complex abstractions accessible and memorable without diluting academic rigor.

Concluding with a practical roadmap, Prof. Tomar called for extensive interdisciplinary research spanning mathematics, Sanskrit, philosophy, history, and computer science. He urged universities to integrate modules on Indian geometry, trigonometry, ancient algorithms, and number theory into undergraduate and postgraduate syllabi. By accurately translating classical

texts, preparing validated textbooks, and publishing high-quality research, academia can preserve India's scientific heritage while enriching contemporary mathematics education.

TECHNICAL SESSION III-B (First Talk): **Realm of Botany: From Ancient Wisdom to Modern Science** (*Parallel)*

Speaker: Prof. Anand Narain Singh, Department of Botany, Panjab University, Chandigarh

Moderator: Prof. Jitender Sharma, Department of Biotechnology, Kurukshetra University, Kurukshetra

This technical session highlighted the profound contributions of the Indian Knowledge System (IKS) to botanical sciences, demonstrating that ancient Indian scholars established systematic botanical understanding millennia before the advent of modern science. Classical texts such as the *Vedas*, *Charaka Samhita*, *Sushruta Samhita*, and *Vrikshayurveda* reveal extensive empirical observations of plant morphology, ecology, forestry, and sustainable cultivation. Central to this tradition was Rishi Parashara, whose *Vrikshayurveda* served as an early taxonomic and agronomic treatise. Parashara classified plants using observable floral and vegetative traits while detailing seed treatment, soil science, crop management, and pest control—embodying modern principles of organic farming and ecological balance.



Beyond agricultural sciences, the lecture explored the cultural, pharmacological, and indigenous dimensions of traditional plant knowledge. The reverence for sacred flora like Tulsi, Neem, and Peepal functioned as an early mechanism for biodiversity conservation through sacred groves and protected habitats. The session also examined the sophisticated Ayurvedic *Rasa–Guna–Virya–Vipaka* framework, which evaluates medicinal plants through taste, quality, potency, and post-digestive metabolic effects to predict their pharmacological action. Complementing these classical texts, indigenous and tribal ethnobotanical traditions have preserved vital knowledge regarding wild edibles, fibres, and medicines, underscoring the modern necessity for ethical documentation, prior informed consent, and safeguards against biopiracy.

The session bridged historical wisdom with modern advancements by recognizing the foundational architects of Indian botany. Key figures included Professor Birbal Sahni in paleobotany, Professor Panchanan Maheshwari in plant embryology, Dr. E. K. Janaki Ammal in cytogenetics and crop breeding, and Professor B. G. L. Swamy in plant morphology and taxonomy. Their scientific breakthroughs laid the groundwork for independent India's botanical research infrastructure and global standing.

It was emphasized that integrating IKS into higher education aligns with the objectives of the NEP 2020 by fostering interdisciplinary inquiry and scientific validation. Rather than treating ancient literature merely as historical artifact, embedding traditional botanical wisdom into modern curricula encourages critical analysis through contemporary scientific tools. This holistic approach connects indigenous heritage with modern innovation to advance sustainable agriculture, healthcare solutions, biodiversity conservation, and environmental resilience.

TECHNICAL SESSION III-B (Second Talk): **Home Science through the lens of Indian knowledge system: Preserving heritage, Promoting Innovation**

Speaker: Prof. Beenu Tanwar, BPSMV, Khanpur Kalan

Moderator: Prof. Jitender Sharma, Department of Biotechnology, Kurukshetra University, Kurukshetra

The technical session on integrating the Indian Knowledge System (IKS) into Home Science highlighted the alignment of traditional wisdom with the mandates of the NEP 2020. Emphasizing that IKS must be anchored in authentic sources and scientific rigor rather than unverified beliefs, the speaker positioned Home Science as an ideal interdisciplinary bridge. Core disciplines—including Food and Nutrition, Human Development, Textiles and Clothing, Resource Management, and Extension Education—can meaningfully incorporate indigenous practices when backed by peer-reviewed research, such as studies on millets, fermented foods, turmeric, and gut microbiomes.



To systematically embed IKS into higher education, the session outlined a five-step development framework: identifying traditional practices, systematically documenting them, conducting scientific validation, integrating findings into curricula,

and disseminating resources via academic platforms. Key principles guiding this process include authenticity, inclusivity, regional context, and outcome-based learning. Pedagogical strategies must move away from rote learning toward experiential methods like community immersion, heritage kitchens, field documentation, and farmer interactions, complemented by practical and portfolio-based assessments.

The session also mapped critical research frontiers, highlighting indigenous food biodiversity, sustainable textiles, circular economies, women's traditional knowledge, and climate-resilient food systems. Addressing key hurdles such as sparse documentation, regional variations, and limited validation requires targeted interventions, including digital repositories, faculty development programs, and collaborative community partnerships. Ultimately, revitalizing India's heritage within academia depends on balancing cultural preservation with critical inquiry, ensuring a curriculum that is both globally competitive and locally rooted.



Valedictory Session

In the last session panel discussions were coordinated by Prof. R. K. Moudgil and elaborate discussions were held on the theme of the workshop and the further course of action. In concluding remarks, Prof. Kailash Chandra Sharma, Chairperson of the Haryana State Higher Education Council, highlighted the transformative nature of the workshop, describing it as a paradigm shift in Indian education. He emphasized that education must cultivate not only intellectual abilities but also ethical, emotional, and spiritual dimensions. Furthermore, he noted that *Bhāratīya Jñāna Parampará* provides a robust framework to bridge theoretical concepts with real-world applications, ultimately fostering critical thinking, creativity, and moral reasoning among students.







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