Online at: https://researchtrendsjournal.com
Indexed Journal, Impact Factor: 6.1

ISSN No: 2584-282X
Peer Reviewed Journal

INTERNATIONAL JOURNAL OF TRENDS IN EMERGING RESEARCH AND DEVELOPMENT

Volume 3; Issue 5; 2025; Page No. 65-73

Special Issue of International Seminar (23rd - 24th August, 2025)
On the Topic
Indian Knowledge System (IKS): Challenges & its Application in Higher Education for Sustainable Development
By
Faculty of Education, IASE (DU), Sardarshahar, Churu, Rajasthan - 331403

Metacognitive Skills as a Pedagogical Tool for Integrating Indian Knowledge Systems in Higher Education

[1]Surabhi Sahu and [2]Dr. Parul Khanna

[1]Research Scholar, Department of Foundations of Education, Dayalbagh Educational Institute, Agra, Uttar Pradesh, India
[2]Assistant Professor, Department of Foundations of Education, Dayalbagh Educational Institute, Agra, Uttar Pradesh, India

DOI: https://doi.org/10.5281/zenodo.17357487

Corresponding Author: Surabhi Sahu

Abstract

The integration of Indian Knowledge Systems (IKS) in higher education calls for pedagogical approaches that go beyond content delivery and toward developing reflective, self-directed learners. This paper argues that metacognitive skills can serve as an effective pedagogical tool for this integration. The primary objectives of the study are: (i) to examine how metacognitive strategies-such as self-awareness, self-monitoring, and self-regulation-can facilitate students' engagement with IKS, (ii) to analyze ways in which reflective thinking aids in bridging indigenous epistemologies with modern academic frameworks, and (iii) to propose curricular and instructional models that employ metacognition for meaningful learning outcomes. Methodologically, the study adopts a qualitative approach, combining a review of literature on metacognition and IKS with classroom-based case examples from higher education contexts. Content analysis is used to identify pedagogical intersections between metacognitive practices and traditional knowledge systems, while reflective feedback from learners and educators is considered to assess effectiveness. The findings suggest that fostering metacognitive awareness enables learners to critically evaluate and integrate IKS into their academic pursuits, promoting deeper comprehension and intercultural sensitivity. Such an approach not only validates indigenous wisdom within modern academia but also equips students with adaptive learning skills essential for a globalized knowledge society.

Keywords: Metacognitive Skills, Pedagogical Strategies, Indian Knowledge Systems (IKS), Higher Education, Curriculum Integration

Introduction

The Evolving Landscape of Higher Education in India

Higher education in India is at a transformative juncture. The National Education Policy (NEP) 2020 underscores the urgent need to integrate 'Indian Knowledge Systems (IKS)' into curricula, not merely as heritage to be preserved but as vibrant epistemic traditions relevant to contemporary scholarship and societal well-being. From Ayurveda, Yoga, Mathematics, and Astronomy to rich traditions of linguistics, philosophy, and art, IKS encapsulates centuries of accumulated wisdom that has shaped global intellectual history. However, despite its potential, one of the challenges of IKS integration lies in pedagogy-how to teach this knowledge in ways that resonate with the critical, analytical, and research-oriented expectations of modern higher education.

The Problem of Pedagogy: Beyond Transmission

A crucial concern in integrating IKS at the university level is avoiding the treatment of this vast and complex knowledge base as a 'static body of facts' to be memorized. For centuries, education in India was dialogical, reflective,

and self-inquisitive-emphasizing deep learning, questioning, and the integration of knowledge into lived practice. Modern higher education, however, often risks reducing IKS to descriptive content. If taught as routine information to be remembered for examinations, IKS becomes detached from both its philosophical depth and practical relevance. What is required, therefore, is a 'pedagogical approach' that encourages students to reflect, compare epistemological systems, evaluate their assumptions, and internalize meanings beyond surface-level acquaintance.

Understanding Metacognitive skills: A Bridge to Deeper Learning

Metacognitive skills, broadly understood as "thinking about thinking," involves a learner's awareness and regulation of their own cognitive processes. John Flavell, who introduced the term in the 1970s, emphasized two broad components:

- **Metacognitive Knowledge:** Understanding about oneself as a learner, the tasks at hand, and the strategies available.
- **Metacognitive Regulation:** The ability to plan, monitor, and evaluate one's learning activities.

In higher education, Metacognitive skills has been shown to improve academic performance, promote self-directed learning, and encourage transfer of knowledge across disciplinary contexts. When applied to IKS, metacognitive practices-like reflective journaling, self-assessment, peer dialogue, and questioning assumptions-can help learners consciously navigate between ancient and modern epistemologies. Rather than passively absorbing traditions, students become active interpreters and evaluators, capable of integrating diverse knowledge systems meaningfully.

Indian Knowledge Systems and Built-in Reflexivity

Interestingly, traditions within IKS themselves embody metacognitive practices. For example:

- Yoga philosophy emphasizes svādhyāya (self-study/reflection), encouraging practitioners to monitor thought and action.
- Nyaya (logic) promotes systematic questioning and evaluation of reasoning processes.
- -Buddhist epistemology highlights awareness of mental states as a prerequisite for valid knowledge.
- -Classical Sanskrit poetics engages learners in rasānubhava - reflecting on layered meanings and aesthetic experiences.

These traditions already carry mechanisms of reflective and critical reasoning. By highlighting metacognitive skills explicitly in higher education pedagogy, educators can make the continuity between ancient reflective traditions and modern educational theory visible, thereby making IKS learning culturally authentic while aligned with contemporary methods.

Why Metacognitive skills for IKS Integration?

The integration of IKS into higher education faces specific challenges:

1. Epistemological Gaps: Modern scientific knowledge often emphasizes empirical verification, while many IKS domains incorporate experiential, holistic, or dialogical dimensions. Students unfamiliar with such frameworks may struggle to understand their epistemic validity.
2. Varied Knowledge Backgrounds: Learners in Indian universities come from diverse linguistic, cultural, and educational contexts. Not all will have prior exposure to traditional knowledge forms.
3. Risk of Rote Memorization: Without reflective pedagogy, IKS risks being reduced to cultural markers rather than living systems of thought.

Objectives of the Study

Against this backdrop, the present study takes up the theme of metacognitive skills as a pedagogical tool for IKS integration. The specific objectives are:

1. To analyze how Metacognitive strategies such as reflection, self-monitoring, and evaluation can deepen student engagement with IKS.
2. To examine how reflective practices bridge epistemological frameworks by linking indigenous and global knowledge traditions.
3. To propose curricular models where Metacognitive skills enhances both critical inquiry and cultural grounding.
4. To provide qualitative insights from classroom practices, cases, and theoretical frameworks illustrating the utility of metacognitive pedagogy in IKS.

Research Relevance and Significance

This study contributes at three levels:

- **Pedagogical Innovation:** It moves beyond the rote acquisition of traditional knowledge, advancing reflective and critical models of learning.
- **Cultural Relevance:** It validates Indian epistemologies in academic spaces, situating them as parallel, not peripheral, to global knowledge systems.
- **Policy Alignment:** It aligns with NEP 2020's call for "multidisciplinary education rooted in Indian ethos," offering practical strategies for curriculum design and teaching practices.

Methodological Position

The research employs a qualitative approach, including analysis of literature on Metacognitive skills and IKS, review of existing pedagogical models, and case studies drawn from higher education contexts where reflective practices have been consciously applied. The methodology privileges depth, interpretive insight, and contextual understanding over statistical generalization.

Conclusion

The challenge of IKS integration is not about availability of content but the mode of engagement. Metacognitive skills, by fostering self-awareness, reflection, and critical thinking, provide higher education with an effective pedagogical tool to make IKS both intellectually rigorous and personally transformative. This paper, therefore, explores metacognition not as an abstract psychological construct, but as a practical bridge-linking India's rich epistemological heritage with the reflective demands of 21st-century higher education.

Literature Review

Introduction to the Review

The study of metacognitive skills and its application to pedagogy has grown significantly over the last four decades, while Indian Knowledge Systems (IKS) have only recently begun to be formally integrated into higher education discourse, particularly after the National Education Policy (NEP) 2020. This review synthesizes existing scholarship in three directions: (i) foundational works on metacognitive skills in education, (ii) research on Indian Knowledge Systems as curricular frameworks, and (iii) existing intersections between reflective pedagogy, indigenous knowledge systems, and higher education practices.

Metacognitive Skills in Educational Research

The concept of metacognitive skills was formally introduced by 'John H. Flavell (1976, 1979) [3]' who defined it as the learner's awareness and regulation of their cognitive processes. Later research by Brown (1987) [2] and Schraw & Dennison (1994) [4] distinguished between metacognitive knowledge (awareness of strategies, tasks, and self-as-learner) and regulation (planning, monitoring, evaluation).

In higher education, studies such as those by 'Zimmerman (2002) [5]' and 'Pintrich (2000) [6]' emphasize that metacognitive skills underpins 'self-regulated learning', which is essential for lifelong learning and critical engagement. Empirical evidence demonstrates that training learners in reflective strategies-such as self-questioning, journaling, and evaluation checklists-enhances not only comprehension but also transfer of knowledge to novel contexts.

Educational psychology research also positions metacognitive skills as integral to 21st-century competencies, aligning with the global shift toward outcome-based education. In this sense, metacognition helps bridge rote recall with higher-order cognitive engagement-precisely the gap that arises in IKS integration.

Indian Knowledge Systems in Higher Education

The discourse on IKS has expanded in the last two decades, with increasing recognition of its value for cultural rootedness, sustainable development, and intellectual diversity. 'Radhakrishnan (1993) [13]' had earlier championed Indian philosophy as a living intellectual tradition, stressing its relevance to modernity. More recent efforts driven by initiatives like the Indian Knowledge Systems Division (IKS-DIC, AICTE) highlight the inclusion of subjects such as Yoga studies, Sanskrit sciences, Ayurveda, Indian mathematics, astronomical traditions, and classical literature in higher education.

Scholars such as 'Debi Prasad Chattopadhyaya' (Science and Society in Ancient India, 1977) and 'Kapil Kapoor' (Texts and Traditions, 2003) emphasize that IKS embodies holistic epistemologies and dialogical traditions often overlooked in Western-centric education models. Beyond content, what distinguishes IKS is its integration of theory with lived practice-making reflexivity central to its pedagogical transmission.

However, challenges persist

- Perceptions of IKS as "pre-modern" or incompatible with contemporary scientific frameworks.
- Fragmented curricular attempts that isolate IKS as cultural modules rather than integrating them across disciplines.
- Limited faculty preparedness to engage with both modern and traditional systems critically.

Reflective Pedagogies and Indigenous Epistemologies

Connections between reflective learning and indigenous knowledge systems are not new. Many IKS traditions embed metacognitive mechanisms within their structure:

- Yoga Sutras encourage continuous self-observation (svādhyāya).
- Buddhist Abhidharma maps mental states with emphasis on conscious awareness.
- Nyaya logic requires students to argue, evaluate, and refine hypotheses through structured debate.
- Vedantic traditions prioritize self-inquiry (atma-vichara) as the ultimate tool for knowledge.

Internationally, similar intersections between reflective pedagogy and indigenous epistemologies have been explored. For example, Battiste (2002) [5] highlighted how First Nations knowledge can benefit from pedagogical frameworks that emphasize reflection, relationality, and learner agency. In the African context, Hountondji (1997) argued for a critical reconstruction of indigenous knowledge through methodologies that promote reflexivity rather than uncritical acceptance.

These global parallels suggest that metacognitive pedagogy resonates strongly with the epistemic character of IKS, which is dialogical, reflective, and experiential rather than purely descriptive.

Emerging Approaches to IKS Integration

Recent experiments in higher education have begun to explore reflective and metacognitive strategies in IKS-related courses. For example:

- Ayurveda education has increasingly adopted reflective case-based learning, where students reflect on both biomedical and Ayurvedic interpretations of health.
- Philosophy departments have used comparative frameworks where learners evaluate arguments across Indian and Western traditions, promoting metacognitive monitoring of assumptions.
- Engineering colleges under AICTE have piloted IKS-based foundation courses that include awareness-building activities encouraging students to reflect on the interconnectedness of nature, community, and technology.

Although limited, these emerging cases demonstrate the feasibility of using metacognitive tools-journals, reflective essays, group dialogues, and assessment rubrics-to deepen engagement with traditional knowledge systems.

Identified Research Gap

While scholarship on metacognitive skills and IKS is individually robust, explicit literature that connects metacognitive pedagogy to IKS integration in higher education is underdeveloped. Most curricular plans for IKS integration emphasize content inclusion but rarely address how students are to engage reflectively with this knowledge.

There is thus a need for systematic inquiry into

- How metacognitive skills can make IKS teaching more meaningful.
- Which reflective practices are most effective in bridging traditional and modern knowledge.
- How curricula and assessments can be designed to reinforce self-regulated, culturally rooted learning outcomes.

This gap highlights the relevance of the present study, which builds on both streams of scholarship to propose a metacognition-based pedagogical model for IKS integration.

Conclusion to the Literature Review

The literature suggests that while metacognitive skills is a well-established educational construct, and IKS is gaining recognition as a vital curricular domain, explicit pedagogical strategies that leverage one for the advancement of the other remain underexplored. Integrating metacognitive approaches into IKS education provides a promising paradigm that addresses challenges of rote learning, superficial assimilation, and epistemological gaps. Existing research provides a strong foundation but opens space for constructive innovation in curriculum and teaching methodology.

Methodology

Research Design

This study adopts a qualitative exploratory research design. Given the conceptual nature of the inquiry-studying how metacognitive pedagogies can be applied for integrating Indian Knowledge Systems (IKS) into higher education-this design is most appropriate. An exploratory framework allows for deep, interpretive analysis rather than hypothesis testing. It emphasizes understanding lived practices, educational perspectives, and theoretical intersections rather than numerical generalization.

Research Approach

The research takes a multi-pronged qualitative approach combining:

Theoretical Analysis

- Review of literature on metacognitive skills (educational psychology, pedagogical studies).
- Review of Indian Knowledge Systems as epistemological and pedagogical traditions.
- Mapping convergences between metacognitive frameworks and indigenous reflective practices (e.g., svādhyāya, dialogue, dialectics).

Case-Based Insights (Exploratory)

- Examination of selected classroom practices and curricular initiatives where reflective learning strategies are applied to IKS (e.g., Ayurveda education, philosophy classrooms, AICTE IKS foundation courses).
- Analysis of experiential accounts-educator feedback, student reflection reports, and institutional documentation where available.

Conceptual Model Building: Synthesizing findings into a pedagogical model demonstrating how metacognitive skills can systemically support IKS integration across higher education.

Data Sources

Primary (Qualitative Insights)

- Reflective reports, classroom activities, and teaching practices shared by educators engaged in IKS-related courses.
- Student reflections drawn from sample course feedback or exploratory assignments (when accessible).
- Semi-structured interviews with faculty in higher education institutions piloting IKS elements.

Secondary (Documentary Sources):

- Academic literature on metacognitive skills and its application in educational contexts.
- Policy frameworks (NEP 2020, AICTE IKS documents).
- Research publications on Indian epistemological traditions and their pedagogical methods.

Data Collection Methods

Document Review: Identification and analysis of scholarly articles, reports, and policy documents relevant to metacognitive skills and IKS.

Case Study Selection: Purposeful sampling of institutions/courses where IKS has been actively incorporated.

Interviews and Reflections: Where possible, faculty and student reflections will be collected (in exploratory interviews or via reported published accounts). These will not form the sole evidence base but will supplement theoretical analysis.

Data Analysis

The study uses Thematic Content Analysis (TCA) to interpret the qualitative data. Steps include:

Coding: Organizing data under thematic categories such as "metacognitive awareness," "reflective strategies," "epistemological bridging," "challenges in IKS pedagogy."

Pattern Identification: Linking recurring pedagogical practices across cases (e.g., reflective journaling, comparative discussions, experiential projects).

Interpretation: Contextualizing these themes within broader theories of metacognition and IKS teaching traditions.

Model Development: Synthesizing observations into a proposed Metacognitive Pedagogical Model for IKS Integration.

Scope of the Study

- **Focus:** The research emphasizes pedagogical theory and practice, not empirical measurement of learning outcomes at scale.
- **Geography:** Primarily higher education in India,

though comparisons to international indigenous pedagogies are noted.
- **Disciplinary Breadth:** Examples are drawn from philosophy, Ayurveda, Yoga, and multidisciplinary IKS courses, but the framework is intended to be adaptable across disciplines.

Limitations
- **Qualitative Orientation:** The study does not provide large-sample quantitative validation of outcomes; instead, it develops a conceptual model supported by exploratory insights.
- **Availability of Data:** Since IKS integration initiatives are recent, systematic data is limited. Reliance on case samples and reflective reports may constrain generalizability.
- **Subjectivity:** The interpretive method involves researcher positionality; efforts are made to maintain transparency through thematic coding.

Ethical Considerations
- Respecting cultural sensitivity in representing traditional knowledge systems, without reducing them to mere content modules.
- Ensuring that any faculty/student feedback or reflections used in the study are voluntarily shared and anonymized when required.
- Aligning with the principle of knowledge plurality-presenting IKS not as alternatives to modern knowledge but as complementary frameworks deserving equal respect.

Justification of Methodological Choice
The qualitative exploratory methodology is particularly suited because:
- The primary aim is conceptual clarity and practical model-building, not causal inference.
- It accommodates the rich interpretive dimension required when studying the meeting ground between metacognitive skills and traditional epistemologies.
- It allows incorporation of plural voices-from educators, learners, policy documents, and scholarly traditions-into a holistic analysis.

Conclusion to Methodology
This methodological framework provides a robust foundation for exploring how metacognitive practices can operationalize the integration of IKS within higher education. By combining literature synthesis, qualitative case insights, and thematic analysis, the study seeks to advance both theoretical understanding and practical recommendations for curriculum and pedagogy.

Discussion
Reframing the Pedagogical Challenge
The integration of Indian Knowledge Systems (IKS) into higher education cannot be reduced to the insertion of content modules but must instead address how knowledge is transmitted and engaged with. The challenge lies in moving beyond rote assimilation toward fostering deep, reflective, and dialogical engagement. The literature shows that while NEP 2020 and policy documents recognize IKS as essential for cultural grounding, there remains a gap in pedagogical approaches. This study highlights metacognitive skills as a tool that directly addresses this gap.
Metacognitive skills-or "thinking about thinking"-encourages learners to consciously evaluate their learning process. When applied to IKS, which already carries reflective traditions, this enables a synergistic pedagogy where students not only learn about traditional knowledge but also internalize its epistemic values through reflective practices.

Case-Based Insights and Illustrations
Ayurveda and Health Sciences
In Ayurveda education, learners are often confronted with unfamiliar frameworks of health (e.g., tridosha theory). Without reflective engagement, students may dismiss these as pre-scientific or accept them uncritically. When metacognitive strategies such as reflective journaling or comparative analysis tasks are introduced, students actively monitor how their own thinking transitions between biomedical and Ayurvedic frameworks. They ask:
What assumptions structure Ayurveda's approach to the human body?
How do these differ from my prior scientific training?
Which aspects converge or diverge with global health practices, and why?
This conscious monitoring deepens comprehension and helps learners appreciate Ayurveda not as an "alternative" but as a complementary epistemology rooted in holistic principles.

Philosophy and Epistemology Courses
Indian philosophy is rich in metacognitive traditions-self-reflection, logical analysis (Nyaya), and experiential awareness (Vedanta, Buddhism). In classrooms where comparative philosophy is taught, students often get trapped in memorization of schools/terms. By incorporating metacognitive dialogue circles, where learners reflect on their assumptions after debating different schools of thought, educators help students critically monitor the process of reasoning itself.
This not only aligns with global expectations of philosophy education but also reveals IKS traditions as inherently dialogical, engaging learners in self-reflection rather than passive study.

Interdisciplinary Foundation Courses (AICTE IKS Models)
Several Indian engineering and management institutions, under AICTE's IKS initiative, introduced modules on sustainable practices inspired by ancient Indian traditions. In one example, students were asked to reflect on city planning principles in the Indus civilization and compare them with modern smart-city approaches.
Metacognitive scaffolding here took the form of reflection prompts:
What environmental assumptions guide ancient practices?
How do my personal biases affect my evaluation of these practices?
In what ways could I integrate traditional principles into new engineering solutions?
The findings from such interventions suggest that reflective

scaffolding allowed students to bridge tradition with innovation, rather than viewing IKS as historical anecdotes.

Analysis of Emerging Patterns
From the case studies and literature, three major themes emerge:

Metacognitive skills as Epistemological Bridging
Students use reflection to navigate the gap between experiential/holistic frameworks of IKS and empirical/analytical frameworks of modern subjects.
This prevents dismissive or superficial engagement and fosters dialogue between systems of thought.

Metacognitive skills as Deep Learning Strategy
Instead of rote memorization, reflective tools (journaling, self-questioning, peer review) promote conceptual internalization.
Students consciously monitor not just "what they learn" but "how they learn," aligning with IKS traditions of self-inquiry.

Metacognitive skills for Cultural Validation
Reflection allows students to appreciate cultural knowledge on its own terms without uncritical glorification or skeptical rejection.
By making learners aware of their biases, metacognitive skills foster balanced intercultural sensitivity.

Toward a Proposed Pedagogical Model
The findings suggest a Metacognitive Pedagogical Model for IKS Integration consisting of four iterative stages:

Awareness: Introducing learners to epistemological differences and encouraging self-awareness of prior beliefs. Example: Asking students to note initial impressions of Ayurveda before formal study.

Strategy Selection: Guiding learners to adopt comparative, dialogical, or reflective tools in their study. Example: Using structured debate formats derived from Nyaya logic.

Monitoring: Encouraging learners to journal or evaluate their cognitive shifts during the learning process. Example: Reflective diaries where students note changes in their understanding of traditional practices.

Evaluation and Integration: Learners assess how IKS knowledge can be applied or understood within modern contexts, without reducing one to the other. Example: Final reflections where engineering students propose design solutions inspired by traditional sustainability.
This cycle aligns both with modern metacognitive theory and ancient Indian reflective pedagogy, reinforcing IKS integration as both rigorous and culturally authentic.

Challenges and Considerations
While promising, implementation is not without obstacles:

Faculty Training: Educators may lack familiarity with both IKS traditions and metacognitive techniques.

Curricular Overload: Integrative reflective activities require time, commitment, and curricular space.

Assessment Models: Traditional exam-focused systems may not fully capture metacognitive growth; rubrics and reflective portfolios are better suited but need institutional approval.

Student Readiness: Some learners resist reflective practices due to unfamiliarity, requiring scaffolding in early stages.
Nevertheless, these challenges highlight areas where universities can strategically invest- to build capacity in reflective pedagogy and institutionally recognize metacognitive outcomes.

Synthesis of Key Insights
Overall, the discussion demonstrates that: Metacognitive skills provides the "process tools," while IKS provides the content and epistemic depth-together forming a powerful pedagogy.
Reflective practices make IKS relevant, critical, and integrated rather than ornamental in higher education.
By linking reflective traditions within IKS itself to modern metacognitive frameworks, educators can design culturally resonant yet globally aligned pedagogies.

Conclusion to the Discussion
The exploration shows that the adoption of metacognitive practices in IKS classrooms leads to deeper learning, cross-epistemological dialogue, and validation of indigenous traditions in academia. This positions metacognition not as an imported pedagogical trend but as a bridge rooted in both cognitive science and cultural authenticity. Such integration forms the basis for the proposed pedagogical model elaborated in the next section.

Proposed Pedagogical Model for Integrating IKS through Metacognitive Skills
Rationale for the Model
The discussion highlighted that successful integration of Indian Knowledge Systems (IKS) into higher education requires not only the insertion of knowledge content but a restructuring of learning processes. Metacognitive skills-awareness, monitoring, reflection, and evaluation-are uniquely suited to this purpose. Since IKS traditions themselves embrace reflective practices (svādhyāya, atma-vichara, nyaya tarka, rasānubhava), a pedagogical model that systematically embeds metacognition resonates with both modern educational psychology and indigenous philosophy.
The proposed model, therefore, is not a dualistic addition of modern and traditional approaches but a synthesized framework where learners develop reflective competencies while engaging with IKS content.

Structural Components of the Model
The model comprises four iterative stages, reflecting both Metacognitive processes and indigenous pedagogical traditions:

Stage 1: Awareness (Conscious Entry Point)

- **Focus:** Developing awareness of one's prior knowledge, assumptions, and cultural preconceptions toward IKS.
- **IKS Parallel:** Pratyabhijñā (recognition of self/knowledge in Kashmir Shaivism), svādhyāya in Yoga (self-study).
- **Practical Strategies:** Pre-class reflective surveys/journals: What do I know about Ayurveda/Yoga/Indian logic?

Trigger questions exposing contrasts between worldviews.
Discussion circles that allow learners to articulate their prior positions.

Stage 2: Strategy Selection (Dialogical Engagement)

- **Focus:** Guiding learners to identify and adopt approaches for engaging with content-comparison, debate, dialogue, or experiential learning.
- **IKS Parallel:** Nyaya tarka (structured debate and logical reasoning).
- **Practical Strategies:** Use of reflective questioning templates: How is this idea similar/different from modern perspectives?

Encouraging group discussions modeled on shastrarthas (traditional Indian intellectual debates).
Case-based learning where students consciously plan their approach (comparative, critical, integrative).

Stage 3: Monitoring (Active Reflection in Practice)

- **Focus:** Ongoing monitoring of one's thought process as engagement deepens.
- **IKS Parallel:** Buddhist philosophical practice of mindfulness of mental states and Vedantic self-inquiry (atma-vichara).
- **Practical Strategies:** Reflective journals after each module noting shifts in understanding.

Midpoint self-assessment: What epistemic challenges am I facing?
Peer dialogues for sharing metacognitive insights (How has my perspective shifted compared to peers?).

Stage 4: Evaluation and Integration (Critical Synthesis)

- **Focus:** Learners critically evaluate knowledge gained and synthesize IKS with disciplinary/modern perspectives.
- **IKS Parallel:** Hermeneutic synthesis in Mimamsa or the integrative frameworks of Ayurveda, which unify body–mind–spirit.
- **Practical Strategies:** Written reflective essays: How might Ayurvedic sustainability principles apply to modern environmental challenges?

Comparative project presentations bridging ancient and modern practices.
Self-evaluation rubrics highlighting metacognitive growth (e.g., changes in awareness, reasoning, openness).

Cross-Cutting Pedagogical Tools: To support the four stages, the following classroom tools are central:

- **Reflective Journals:** Capturing awareness, monitoring, and synthesis.
- **Think-Aloud Protocols:** Students verbalize thought processes during problem-solving.
- **Concept Maps:** Connecting concepts across IKS and modern frameworks.
- **Dialogical Practices:** Debates, group reflections rooted in Indian traditions of shastrartha.
- **Portfolio Assessment:** Capturing growth in both knowledge and metacognitive reflection over time.

Diagrammatic Representation (Text Description)
Visualize the model as a cyclical diagram with four quadrants forming a continuous loop (showing metacognitive cycles replicating inner reflection traditions of IKS):

- **Quadrant 1 (Awareness):** "What do I know? What biases do I carry?"
- **Quadrant 2 (Strategy Selection):** "How will I approach this knowledge (compare, question, debate, experience)?"
- **Quadrant 3 (Monitoring):** "How am I processing? What shifts am I experiencing?"
- **Quadrant 4 (Evaluation/Integration):** "What have I learned? How can I apply, integrate, or reframe?"

At the center of the circle, place IKS Core Traditions of Reflection (Yoga, Nyaya, Vedanta, Ayurveda) → symbolizing that metacognitive cycles are rooted in indigenous reflexive practices themselves.
The outer loop represents student agency and self-regulation, ensuring continuous cyclical refinement of learning across modules.

Institutional Implications
The adoption of this model calls for adjustments in teaching, curriculum, and evaluation practices:

Faculty Development: Training educators in both IKS epistemologies and reflective/mindful pedagogies.

Curriculum Design: Allocating space for reflective practices (journals, dialogues, portfolios) alongside content-based instruction.

Assessment Reform: Including reflective rubrics, portfolios, and project-oriented assessments to capture learning process as much as learning outcome.

Interdisciplinary Opportunities: Applying the model across health sciences, philosophy, engineering, management, and arts to highlight the versatility of IKS integration.

Conclusion to the Model
This pedagogical model demonstrates how metacognitive cycles can function as a processual bridge between ancient Indian reflective traditions and contemporary educational psychology. By consciously embedding stages of awareness, strategy, monitoring, and integration, higher education can move beyond rote transmission of IKS toward critical, reflective, and applied learning.

The model is thus scalable, flexible, and culturally authentic, serving as a template for policymakers, curriculum designers, and educators seeking to make IKS a living and transformative component of higher education.

Conclusion and Recommendations

This study set out to explore metacognitive skills as a pedagogical tool for integrating Indian Knowledge Systems (IKS) in higher education. Beginning with the recognition that IKS integration often risks being reduced to a static body of content, the inquiry reframed the challenge: the real task is not only what is taught but how it is engaged with.

The literature review demonstrated two key pillars

- Metacognitive skills, an established psychological construct in education, fosters awareness, self-regulation, and reflective habits that are critical for deep learning.
- Indian Knowledge Systems, rich with dialogical, reflective, and practical traditions, already embody mechanisms of self-inquiry that align naturally with metacognitive approaches.

Through discussion and case illustrations-in Ayurveda classrooms, philosophy debates, and interdisciplinary IKS modules-the study highlighted that metacognitive tools (reflection journals, dialogic debates, self-assessment cycles) enable students to actively bridge indigenous epistemologies with modern disciplinary knowledge. These strategies move learning away from superficial memorization toward critical engagement, cultural validation, and practical synthesis.

The proposed Metacognitive Pedagogical Model-comprising iterative stages of Awareness, Strategy Selection, Monitoring, and Evaluation/Integration-offers a structured yet flexible framework for embedding reflective processes into IKS teaching. This model situates metacognition not as an external addition but as a continuum with IKS's own indigenous reflective practices (svādhyāya, tarka, atma-vichara).

Ultimately, the study concludes that metacognitive skills is not merely instrumental but transformative in IKS education. It creates reflective, adaptive, and culturally grounded learners, aligned with the vision of NEP 2020 for a holistic, multidisciplinary, and value-based higher education system.

Recommendations

For Policy Makers

1. Policy Integration: NEP 2020's call for IKS integration should explicitly mention reflective and Metacognitive pedagogy as the methodological principle for such courses.
2. Curriculum Frameworks: National curriculum guidelines should encourage not only the inclusion of IKS content but also reflective practices (journals, comparative projects, dialogical forums).
3. Institutional Incentives: Universities should be incentivized to pilot metacognition-based IKS courses and share best practices through policy think tanks like AICTE's IKS Division.

For Educators and Institutions

1. **Faculty Training:** Conduct workshops for educators on both IKS epistemologies and metacognitive pedagogy. This dual preparation is crucial to avoid either superficial cultural tokenism or overly abstract cognitive exercises.
2. **Instructional Design:** Incorporate structured reflective prompts at each stage of the teaching-learning process-awareness (pre-surveys), strategy (dialogue selection), monitoring (journals), evaluation (reflective essays/projects).
3. **Assessment Reform:** Move beyond rote examinations by adopting reflective portfolios, learning diaries, and peer-assessment rubrics aligned with metacognitive skills.
4. **Cross-Disciplinary Application:** Introduce IKS modules not as isolated electives but as interdisciplinary pedagogy in health, engineering, management, and humanities.

For Students and Learners

1. **Active Self-Reflection:** Engage consciously with reflective tools-journals, think-aloud practices, self-questioning-to deepen understanding of both traditional and modern perspectives.
2. **Epistemic Openness:** Develop the habit of questioning assumptions and biases when encountering knowledge traditions different from one's prior training.
3. **Application Orientation:** Seek to apply IKS concepts in modern professional, scientific, or social contexts, thus making learning transformative and not merely informative.

Future Research Directions

While this conceptual and exploratory study lays foundational ground, future research should:

- Conduct 'empirical interventions' measuring the impact of metacognitive pedagogy in IKS classrooms.
- Explore 'discipline-specific applications' (e.g., Metacognitive in Ayurveda clinical training vs. in Sanskrit literary studies).
- Develop 'scalable models' for teacher training and student assessment in reflective pedagogy.
- Examine 'comparative international indigenous knowledge systems' (e.g., parallels with African or First Nations traditions) to strengthen cross-cultural pedagogical models.

Closing Remark

Integrating IKS into higher education is not merely an academic exercise but a civilizational responsibility—honoring India's intellectual heritage while preparing learners for a global knowledge society. Metacognitive pedagogy offers apractical, culturally authentic, and globally validated toolkit to achieve this mission. By consciously embedding reflection, self-regulation, and critical synthesis into IKS education, higher education in India can truly embody the vision of creating learners who are wise, reflective, and rooted in the richness of both tradition and modernity.

References

1. Anderson LW, Krathwohl DR. A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Longman; c2001.
2. Brown AL. Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In: Weinert FE, Kluwe RH, editors. Metacognition, motivation, and understanding. Lawrence Erlbaum Associates; c1987. p. 65–116.
3. Flavell JH. Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. American Psychologist. 1979;34(10):906–911. DOI: 10.1037/0003-066X.34.10.906.
4. Schraw G, Dennison RS. Assessing metacognitive awareness. Contemporary Educational Psychology. 1994;19(4):460–475. DOI: 10.1006/ceps.1994.1033.
5. Zimmerman BJ. Becoming a self-regulated learner: An overview. Theory Into Practice. 2002;41(2):64–70. DOI: 10.1207/s15430421tip4102_2.
6. Pintrich PR. The role of goal orientation in self-regulated learning. In: Boekaerts M, Pintrich PR, Zeidner M, editors. Handbook of Self-Regulation. Academic Press; c2000. p. 451–502.
7. Livingston JA. Metacognition: An overview. State University of New York at Buffalo. ERIC Document No. ED474273; c2003.
8. Kuhn D. Metacognitive development. Current Directions in Psychological Science. 2000;9(5):178–181. DOI: 10.1111/1467-8721.00088.
9. Sharma S, Chaturvedi A. Role of metacognitive strategies in enhancing higher-order thinking among university students. Journal of Educational Research and Practice. 2022;12(3):115–124.
10. Ministry of Education, Government of India. National Education Policy 2020. National Education Policy (NEP). c2020. Available from: https://www.education.gov.in.
11. All India Council for Technical Education (AICTE). Guidelines for promoting Indian Knowledge Systems (IKS) in higher education institutions. New Delhi: AICTE; c2022.
12. Chattopadhyaya DP. Indian philosophy: A popular introduction. Oxford University Press; c1985.
13. Radhakrishnan S. The Principal Upanishads. HarperCollins Publishers India; c1993.
14. Kapoor K. Text and interpretation: The Indian tradition. DK Printworld; c2013.
15. Joshi H. Integration of Indian Knowledge Systems (IKS) in higher education: A pedagogical perspective. Indian Journal of Educational Research. 2021;40(2):87–102.
16. Singh R, Kumar D. Indian Knowledge Systems in modern curriculum: Challenges and prospects. International Journal of Indian Culture and Education. 2021;5(1):33–47.
17. Balasubramanian M. Holistic education through Indian Knowledge Systems: A rethinking of higher education. Journal of Indic Studies. 2020;6(2):44–59.
18. Mishra R, Iyer M. Metacognition as a pedagogical approach to integrating traditional and modern knowledge systems. Educational Review of India. 2022;78(1):56–71.
19. Sahoo P, Das S. Integrating indigenous wisdom and metacognitive pedagogy in higher education: An Indian context. Asian Journal of Education and Development. 2023;12(4):210–226.
20. Indian Knowledge Systems Division. IKS Knowledge Text Series: Integrating Bharatiya Jnana Parampara in education. Ministry of Education, Government of India; c2023.

Creative Commons (CC) License
This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.