JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Indian Knowledge System and Vocational Education: Exploring Opportunities for Curriculum Design and Assessment

Anoop Kumar Rathore*, Rakesh Kumar Raman and Prakash Chandra Rout

PSS Central Institute of Vocational Education, Bhopal, Madhya Pradesh, India

*Corresponding Author: a.rathore@psscive.ac.in

Abstract

Indian Knowledge System (IKS) represents a rich repository of indigenous wisdom, skills, and cultural practices embedded in India's socio-economic fabric. With the National Education Policy (NEP) 2020 imaging early vocational exposure and the integration of IKS across school and higher education, vocational education in India is undergoing a paradigm shift. This review examines how IKS can meaningfully enrich vocational curriculum design and assessment, with a focus on agriculture, traditional crafts, health, food systems, and local livelihoods. The paper analyses policy directions, pedagogical opportunities, assessment frameworks, and challenges, offering actionable insights for curriculum developers, teachers, and policymakers.

Keywords: Indian Knowledge System (IKS), Vocational Education, NEP 2020, Curriculum Integration

1. Introduction

Indian Knowledge Systems are deeply rooted in India's cultural, ecological, and economic history. They reflect knowledge accumulated over centuries through community experience, experimentation, and adaptation. NEP 2020 recognizes IKS as essential for holistic learning and national development, endorsing its integration into school education and vocational training (Meto *et al*. 2025).

Vocational education, which prepares learners with job-ready skills and entrepreneurial competencies, provides an ideal platform for the integration of IKS. Many vocational skills i.e. agriculture, crafts, food processing, natural health practices, and environmental stewardship are naturally aligned with indigenous knowledge traditions. The shift toward *skills for life and livelihood* under NEP 2020 creates new possibilities for embedding IKS within curricula, pedagogy, and assessment (Boruah 2022).

2. Methodology: Narrative Review Approach

This review synthesizes findings from policy documents (NEP 2020, NCFSE 2023), academic literature, case studies, and community knowledge sources. A narrative review was chosen for its flexibility in integrating diverse types of knowledge like research-based, experiential, and traditional, consistent with the interdisciplinary nature of IKS.

3. IKS and Vocational Education: Conceptual Connections

3.1 IKS

IKS encompasses environmentally adaptive, community-defined, and practice-driven knowledge in domains such as:

- Agriculture and natural resource management

- Traditional crafts (handloom, pottery, carpentry)
- Indigenous health practices
- Food systems and nutrition
- Indigenous engineering (water systems, architecture)
- Local biodiversity and ecological wisdom

3.2 Vocational Education in NEP 2020

NEP 2020 envisions:

- **Vocational exposure from Grade 6:** Students are introduced to basic work-related skills from an early age. This helps them understand different careers and develop practical competencies gradually.
- **Mainstreaming skills across school education:** Skill-based learning is integrated into all subjects and classes. This ensures every student gains essential life and work skills along with academic knowledge.
- **Integration of traditional arts and local knowledge:** Schools include local crafts, culture, and indigenous practices in teaching. This preserves heritage while giving students hands-on, context-based learning.
- **Work-based learning, internships, and community engagement:** Students gain real-world experience through fieldwork, internships, and community projects. These opportunities build confidence, practical understanding, and social responsibility.
- **Competency-based assessment (CBA):** Assessment focuses on what students can *do* rather than what they can memorize. Skills are evaluated through performance tasks, projects, and demonstrations.

3.3 Synergy Between IKS and Vocational Learning

IKS provides:

- Contextualized, localised knowledge
- Natural sustainability principles
- Skills transmitted through hands-on community learning
- Opportunities for entrepreneurship and self-reliance

These align seamlessly with vocational education's mandate for experiential, practice-oriented learning.

4. Opportunities for Curriculum Design Integrating IKS

4.1 Contextualisation and Localisation

IKS driven curriculum allows region-specific knowledge to shape vocational subjects. Examples:

- Indigenous irrigation systems (Johads, Ahars-Pynes) in agriculture vocations
- Bamboo craft in the North-East
- Traditional fisheries in coastal states
- Millet-based food processing in semi-arid regions

This enhances cultural relevance and student engagement.

4.2 Experiential Learning & Work-Based Pedagogy

IKS practices are inherently experiential. Vocational curricula can include:

- **Field immersion with local artisans and farmers**: Students visit and observe traditional experts in real settings. This helps them understand authentic skills, tools, and work processes directly from practitioners.
- **Documentation of traditional practices:** Learners record local methods, rituals, tools, and procedures through notes, photos, or videos. This builds research skills and preserves valuable indigenous knowledge.
- **Community-based apprenticeships:** Students learn by working under skilled community members for short periods. This provides hands-on experience, confidence, and practical mastery of traditional skills.
- **School farms, craft labs, heritage workshops:** Schools create spaces where students can practice farming, crafting, and heritage activities. These labs allow regular, structured skill-building within a safe and supportive environment.

Such experiences promote skill mastery and community connection.

4.3 Sustainability and Ecological Literacy

IKS incorporated sustainability principles such as resource recycling, biodiversity, minimal ecological impact. Curriculum modules may include:

- Organic farming and natural pest management
- Indigenous water harvesting
- Sustainable materials in crafts
- Traditional food preservation

Students learn environmental stewardship alongside vocational skills.

4.4 Integration with Modern Technology

A powerful curricular innovation lies in blending IKS with modern tools:

- IoT-enabled indigenous irrigation systems
- Drones + traditional crop calendars
- Digital documentation of craft techniques
- AI-based pest detection + natural formulations

Such hybrid approaches strengthen both scientific temper and cultural continuity.

4.5 Entrepreneurship and Value Addition

IKS provides rich entrepreneurial potential:

- Herbal products, organic inputs, local food items
- Indigenous craft-based micro-enterprises
- Community heritage tourism
- Local seed banks and plant nurseries

Vocational curricula can embed training in branding, packaging, credit linkages, and digital marketing.

5. Opportunities for Assessment within an IKS-Integrated Vocational Curriculum

IKS integrated assessment aligns strongly with NEP 2020's shift toward **Competency-Based Assessment (CBA)**.

5.1 Portfolio Assessment

Students document:

- **Field visits**: Students record observations from farms, artisans, and local ecosystems, showing how traditional knowledge is applied in real contexts. These reflections help assess experiential learning and understanding of IKS practices.
- **Traditional practices:** Learners document indigenous techniques—such as seed preservation, organic inputs, or local craft methods—to demonstrate awareness and respect for traditional vocational wisdom.
- **Skill demonstration photos/videos:** Photos or short videos capture students performing hands-on tasks, providing authentic evidence of skill proficiency in both IKS-based and modern methods.

This builds reflective thinking and skill evidence.

5.2 Performance-Based Assessment

- **Practical Task Execution:** Students perform real-life vocational tasks—such as preparing organic inputs or operating simple tools—to demonstrate hands-on competency aligned with IKS and modern practices.
- **Problem-Solving Situations:** Learners are given contextual challenges (e.g., choosing a suitable irrigation method) to assess their ability to apply traditional wisdom and scientific reasoning.
- **Role-Play or Demonstrations:** Students act out scenarios like community knowledge-sharing or farm advisory sessions to showcase communication skills and understanding of indigenous practices.
- **Peer and Mentor Observation:** Peers, teachers, or local experts observe and evaluate task performance, ensuring assessment reflects both skill accuracy and cultural relevance.

5.3 Project-Based Assessments

Project-based assessments evaluate students' learning by engaging them in real-life tasks that require planning, problem-solving, creativity, and application of knowledge. Instead of relying solely on written tests, these assessments measure practical skills, teamwork, and the ability to integrate concepts across subjects. Students demonstrate their understanding through hands-on projects such as models, field studies, experiments, or

community-based activities. This approach not only enhances deeper learning but also builds confidence, critical thinking, and vocational readiness.

5.4 Skill Demonstration Through Apprenticeship

Skill demonstration through apprenticeship provides students with authentic, hands-on experience in real work environments. Work-based learning enables continuous assessment through logbooks, supervisor reports, and competency checklists that track daily tasks and skill mastery. These tools offer evidence of practical performance, professionalism, and workplace readiness. Such assessment practices ensure alignment with NSQF occupational standards, helping learners develop industry-relevant competencies and transition smoothly into vocational roles.

6. Case Examples of IKS Integration in Vocational Domains

6.1 Agriculture (Most Relevant to Indian Schools)

- Natural farming (Jeevamrut, Dashparni Ark)
- Soil categorization through indigenous methods
- Mixed cropping systems (Barahnaja)
- Community seed systems
- Traditional weather prediction
- Integrated farming with livestock

6.2 Traditional Crafts

- Pottery, handloom, bamboo craft, leatherwork
- Tools and techniques passed through local guilds
- Indigenous dyes and traditional looms

6.3 Food Processing and Nutrition

- Millet-based foods
- Traditional fermentations (kanji, pickling)
- Sun drying, smoking, indigenous storage methods

6.4 Health and Wellness

- Basic concepts of Ayurveda, yoga, naturopathy
- Herbal home remedies (non-medical)
- Traditional preventive practices

7. Challenges in Integrating IKS into Vocational Education

7.1 Documentation Gaps

Large portions of IKS are unwritten or community-protected.
Requires:

- Participatory documentation
- Localized curriculum development

7.2 Teacher Preparedness

Teachers need oriented training in:

- Community-based pedagogies
- Local IKS practices
- Interdisciplinary teaching

7.3 Balancing Tradition and Science

IKS must be validated through:

- Scientific reasoning
- Responsible integration
- Avoiding romanticization

7.4 Curriculum Overload

IKS should enhance not complicate vocational courses.

8. Recommendations for Curriculum Designers and Policymakers

1. **Local Curriculum Cells**: District-level teams to contextualize IKS.
2. **Teacher Training:** Mandatory modules on IKS, crafts, agriculture.
3. **School Labs & Farms:** Living labs for IKS–tech integration.
4. **Community Partnerships:** Engage farmers, artisans, tribal elders.

5. **Digital Documentation:** Create student-generated IKS databases.
6. **Assessment Reforms:** Focus on performance, portfolios, apprenticeships.
7. **Integration with Entrepreneurship:** Link IKS knowledge to micro-enterprise opportunities.

9. Conclusion

IKS offers a transformative avenue for revitalizing vocational education in India. By grounding curricula in indigenous knowledge while integrating modern tools and scientific validation, education can become more locally relevant, sustainable, and empowering. An IKS-integrated vocational framework aligns perfectly with NEP 2020's vision of holistic, experiential, and culturally rooted learning. The potential lies in creating a generation of learners who value heritage, practice sustainability, and innovate for their communities.

References:

Boruah, N. (2022). Vocational education in India: Issues and challenges. International Journal of Health Sciences, 6(S1), 3385–3391.

Meto, M, Jomyang, N, Tok, BR and Sankar, CS. 2025. Vocational Education in India: Challenges and Opportunities in the 21st Century. International Journal of Science and Research Archive, 2025, 16(02), 1461-1469.

National Curriculum Framework for School Education (NCFSE) 2023. NCERT, New Delhi. National Education Policy 2020. Ministry of Education, Government of India.