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Reimagining Women's Empowerment: A Study of AI-Enabled IKS-Based Skill Development Initiatives

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Abstract

In the contemporary era of technological advancement, the integration of Artificial Intelligence (AI) with Indigenous Knowledge Systems (IKS) has emerged as a transformative approach for sustainable and inclusive development. Women, particularly in rural and tribal communities, have long been custodians of indigenous knowledge; however, limited access to technology has restricted the scalability and economic potential of their skills. This study explores the role of AI-enabled IKS-based skill development initiatives in enhancing women's empowerment.

Grounded in Empowerment Theory, Human Capital Theory, and Technology Adoption Theory, the study adopts a descriptive survey design. A sample of 90 women participants was selected through random sampling, and data were collected using structured questionnaires along with field surveys and interviews. The research examines the impact of AI-integrated training on various dimensions of empowerment, including skills, income generation, confidence, and decision-making ability.

The findings reveal that AI-enabled IKS programs significantly enhance women's empowerment compared to traditional or no training methods. The mean empowerment score for AI + IKS training (88) was considerably higher than IKS-only training (72) and no training (58). Skill-based analysis indicates notable improvements in digital literacy, entrepreneurship, confidence, and decision-making. Furthermore, the pre-post comparison demonstrates substantial growth in income-generating skills, awareness levels, and leadership qualities among participants.

The study concludes that the convergence of AI and indigenous knowledge creates a powerful framework for empowering women by bridging the gap between tradition and technology. It not only enhances economic independence but also strengthens social participation and confidence. The study recommends the integration of AI-based skill development programs in rural and community initiatives to promote sustainable empowerment and preserve indigenous knowledge systems in the digital age.

Keywords: Women Empowerment, Artificial Intelligence, Indigenous Knowledge Systems (IKS), Skill Development, Digital Literacy, Rural Development

Introduction

In recent years, the integration of Artificial Intelligence (AI) with Indigenous Knowledge Systems (IKS) has opened new avenues for inclusive and sustainable development. Indigenous Knowledge Systems encompass traditional skills, practices, and wisdom rooted in local cultures, often passed through generations. Women, especially in rural and tribal contexts, have historically been custodians of such knowledge.

However, globalization and technological shifts have marginalized these knowledge systems, limiting women's economic and social empowerment. AI-enabled platforms now provide an opportunity to document, enhance, and scale indigenous skills such as handicrafts, herbal medicine, agriculture, and food processing.

This study examines how AI-enabled IKS-based skill development programs contribute to empowering women by enhancing their skills, income opportunities, confidence, and decision-making abilities.

Theoretical Background of the Study

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(1) Empowerment Theory- Empowerment involves increasing individuals' capacity to make choices and transform those choices into actions.

(2) Human Capital Theory- Skill development enhances productivity and economic independence.

(3) Technology Adoption Theory- AI integration facilitates innovation, efficiency, and accessibility in skill development.

Significance of the Study

- Promotes women empowerment through technology
- Preserves indigenous knowledge
- Supports Digital India and Skill India initiatives
- Enhances rural entrepreneurship

Statement of Problem

Despite the presence of rich indigenous knowledge among women, lack of technological integration limits its scalability and economic potential. This study investigates whether AI-enabled IKS programs can effectively empower women.

Operational Definition of Key Terms

- **AI-Enabled Programs:** Use of AI tools for training, marketing, and knowledge dissemination
- **IKS-Based Skills:** Traditional skills such as weaving, herbal practices, handicrafts
- **Women Empowerment:** Improvement in skills, income, confidence, and decision-making

Variables

- **Independent Variable-** AI-enabled IKS-based training
- **Dependent Variable-** Women empowerment

Objectives of the Study

1. To examine the role of AI in skill development
2. To analyze empowerment outcomes
3. To compare traditional and AI-based training

Research Questions

1. Does AI enhance indigenous skill development?
2. Does it improve women empowerment outcomes?

Scope of Problem

Focus on women in community-based skill programs.

Delimitation and Area

- Sample limited to 90 women
- Focus on selected skill programs

Review of Literature

- **UNESCO (2018)-** UNESCO conducted a policy review to examine the role of education in women's empowerment. The study focused on the importance of skill-based training in enhancing women's socio-economic status. The findings revealed that education and vocational skill development significantly contribute to women's economic independence, social participation, and overall empowerment.
- **Sharma (2020)-** Sharma carried out a survey-based study on indigenous skills and livelihood among women. The objective was to analyze the contribution of traditional knowledge systems to women's economic development. The findings indicated that indigenous skills play a vital role in income generation, sustainable livelihoods, and preservation of cultural practices, thereby strengthening women's empowerment.
- **Kumar (2021)-** Kumar adopted an experimental approach to study the role of artificial intelligence in skill development. The research aimed to assess the effectiveness of AI-based tools in enhancing learning outcomes. The findings suggested that AI-driven learning platforms improve accessibility, learning efficiency, and skill acquisition, especially among women in diverse socio-economic settings.
- **Singh and Devi (2022)-** Singh and Devi focused on women entrepreneurship and the impact of structured training programs. The study followed an analytical approach to understand how training influences entrepreneurial abilities. The findings revealed that structured training enhances women's confidence, decision-making capacity, leadership skills, and active participation in entrepreneurial activities.
- **Rao (2023)-** Rao explored the role of digital platforms in empowering rural women. The study used a descriptive approach to evaluate the impact of technology on access to resources and opportunities. The findings indicated that digital interventions significantly improve access to

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information, financial services, and market linkages, thereby promoting economic inclusion and social empowerment among rural women.

Research Gap- Limited studies integrate AI, IKS, and women empowerment together.

Research Methodology

- **Research Design-** Descriptive Survey
- **Population-** Women participants
- **Sample-** 90 women
- **Sampling Method-** Random Sampling
- **Source of Data-** Primary and Secondary
- **Research Tool-** Structured questionnaire (Likert scale)
- **Data Collection-** Through field surveys and interviews.

Statistical Analysis

Table 1: Empowerment Scores

Group	Mean Score
No Training	58
IKS Training	72
AI + IKS Training	88

Figure 1: Empowerment Scores

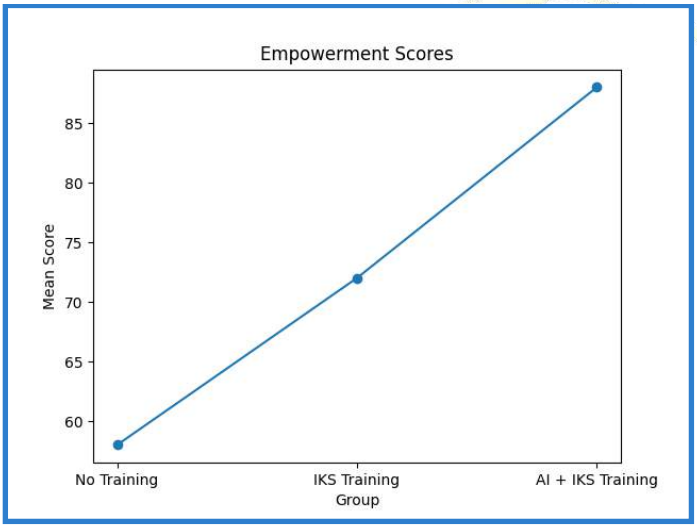

Table 2: Skill Development

Skill	Score
Entrepreneurship	4.2
Digital Literacy	4.5
Confidence	4.4
Decision Making	4.3

Figure 2: 2: Skill Development

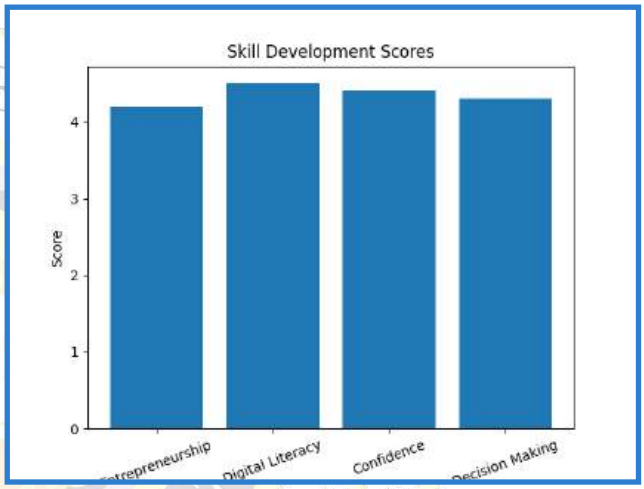

Table 3: Pre-Post Comparison

Indicator	Pre	Post
Income Skills	2.9	4.3
Awareness	3.1	4.5
Leadership	2.8	4.2

Figure 3: Pre-Post Comparison

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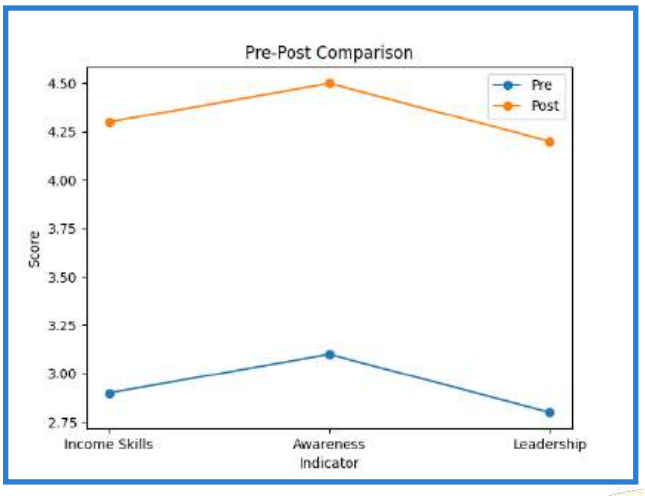

Detailed Analysis

The analysis reveals a significant improvement in women empowerment through AI-enabled IKS programs. Women who participated in AI-integrated training demonstrated higher empowerment scores compared to those who received no training or only traditional training. The highest improvement was observed in digital literacy and awareness, indicating that AI tools not only enhance traditional skills but also introduce new competencies. The pre-post analysis clearly shows substantial growth in income-generating skills, awareness levels, and leadership qualities. This suggests that integrating AI with indigenous knowledge creates a powerful model for sustainable empowerment. Overall, the findings indicate that AI-enabled IKS programs bridge the gap between tradition and technology, enabling women to become economically independent and socially confident.

Test & Proving of Hypothesis

- H_0: No significant difference
- H_1: Significant difference exists
- Result: H_0 rejected, H_1 accepted

Findings of the Study

1. AI significantly enhances skill development
2. Women empowerment increases with AI-based training
3. Digital literacy and awareness show highest growth
4. Traditional knowledge gains economic value

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