

AI AND SUSTAINABLE DEVELOPMENT GOALS (SDGs)

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Abstract

Artificial Intelligence (AI) has become universal across diverse sectors, permeating every aspect of our lives regardless of age or profession. Artificial Intelligence acts as a powerful catalyst for the UN Sustainable Development Goals (SDGs), enabling progress on 134 targets (roughly 80%) by optimizing energy, enhancing diagnosis and improving climate modelling. This paper narrates the role of Artificial Intelligence (AI) in advancing the Sustainable Development Goals across multiple sectors such as Environmental Action (SDGs 13, 14, 15), Social Development (SDGs 3,4), Economic Growth & Infrastructure (SDGs 8,9) where impact of AI is commendable. Few risk and challenges are bias and inequality (SDGs 5, 10) which may amplify existing social biases and environmental footprints where the high energy consumption of training large AI models can contradict climate goals. Since COVID19 hit the global health system, the concept of AI has created a revolution in healthcare, such as uprising could be another step forward to meet the future healthcare needs. Despite a growing body of research on ethical frameworks for artificial intelligence, there remains a lack of empirical understanding of how users perceive potential and ethical priorities depending of specific goal. For maximizing positive impact, AI development must be guided by responsible, ethical and inclusive framework.

Key word: Artificial Intelligence, Sustainable Development Goal

Introduction

Recent years we have tremendous development in the area of artificial intelligence. “Artificial Intelligence” refers to a computer’s capacity to learn and remember information, as well as to recognize patterns. apply logic. create plans, solve problems and carryout of wide variety of other cognitive tasks normally associated with human brain. AI is the science of creating computer systems capable of performing tasks that require human intelligence (reasoning, leaning and pattern recognition). The Term Artificial Intelligence was coined by John McCarthy in Dartmouth Conference at 1956, aiming to stimulate human thinking machines. AI refers to computer systems that can perform human tasks, learn from data, and solve complex problem. It has been defined by pioneer Marvin Minsky “The science of making machines do things that would require intelligence if done by men”.

AI technologies offer three main benefits --- (i) Ai permits the automation of repetitive and time consuming tasks, allowing human to focus on high value work, (ii) it reveals insights which required human management and analysis such as videos, photos, written reports, business

documents , social media posts or email messages, and (iii) AI can integrate thousands of computers and other resources to solve the most complex problems .

The world had entered a critical crisis due to global warming and climate change. More than three-decade Brundtland Commission Report, the world continues to struggle with the need to transform human activities to ensure long term existential survival, although the challenges are exceedingly complex and require all our technological expertise to develop immediate and long-term solutions.

The sustainable development goal (SDG), also known as the global goal was adopted by the United Nations in 2015 as a universal call, the spectrum of 17 SDGs and 169 targets to eradicate poverty, improving human health and sanitation, and to safeguard the global ecosystems on which humanity depends on for their survival. the Government of India committed the agenda of SDG. The Prime Minister India in his statement of Sustainable Development Summit in New York on 25th September 2015 affirmed commitment for fulfilling agenda of SDG by 2030. Further, he has reiterated the importance of SDG in global level, such as G-20 meetings. NITI Aayog has constructed the SDG India index spanning across 13 out of 17 SDGs (leaving goals of 12, 13, 14 and 17) this index track the progress of states for attaining goal of SDG. Based on the data at the national level and to ensure comparability across Union states and Union Territories (UTs), 5 national indicators are selected to eradicate poverty which has been selected out of 7 SDG targets for 2030 outlined under this goal.

Sustainable Development Goal and AI

Artificial Intelligence aims to benefit the society, currently working excellently for attaining sustainable development goals.

Metamorphose in healthcare and education (SDG 3 and 4)

Artificial Intelligence revolutionizing good health and wellbeing by diagnosing, personalizing treatment and strengthening public health system. hospital of India is rapidly adopting Artificial intelligence to improve patient care and to improve healthcare system both in government and private sectors.

- Government Institute of Medical Sciences (GIMS), Greater Noida inaugurated India's first government AI clinic in January 2026, which uses AI and generic screening to analyse blood test, V-Ray, CT scan, and clinical data for early detection of cancer, heart diseases and other diseases.

- Apollo Hospital---They have developed Cardio-vascular disease (CVD) risk score skill tool, that can predict 10 years heart disease or stroke risks with 90 % accuracy this hospital also uses AI for real time patient monitoring (Enhanced Connected Care) and launched an AI Precision Oncology Centre.
- Narayana Health---they have started Echocardiogram in remote areas with collaboration with Microsoft and AI, for early detection of cardiac disorders. They also use data to optimize ICU throughout, predict blood requirement and manage consumables.
- Medanta-The Medicity---is the first hospital in India to use AI-enabled Penumbra Lighting Technology for selective clot extraction in pulmonary embolism patients.

AI enhances quality education by enabling personalised learning automating administration tasks, accessing the resources. In current years, AI supporting the students 24 x7 via chatbox and also helping educators to improve teaching methods and ultimately enhancing learning outcome.

- AI adapts content and pacing to meet individual student need and improving understanding and motivation.
- AI acts as 24x7 hour tutorial class for students.
- AI helps the students to improve the learning experience by reducing educational gap and enhanced security and help in tutorial class for students.
- Educators can analyse data to monitor students' performance, identifying those needing extra support only.
- AI also helps to monitor other employees by streaming process, managing campus infrastructure and analysing.

Endowment of AI Gender equity (SDG 5)

AI offering tools to accelerate equality and gender bias, help to personalize learning platform enabling girls and women for educational opportunities and developing professional growth.

AI also provide digital platform regarding health information of women and aids for detecting digital harassment and contributing safety of women.

Combating the climatic action (SDG 13)

To fight against the climate change could receive a boost of AI. Complex climate modelling initiatives such as Destination Earth (Destin E) led by European Space Agency providing deeper understanding of our climate system and Fire ALD developed by World Economic Forum help to predict wild fires .AI can empower researcher and policy makers to develop effective solution

in both climate mitigation and adaptation. Climate modelling and prediction, energy optimization, early warning systems, environmental monitoring and precision of agriculture.

Pursuing AI in life below water and life on land (SDG 14 and SDG 15)

AI powered drones identifying ocean debris, and predictive modelling for coral life restoration, that accelerate research on oceanography, identifying trends in marine data and promoting the transfer of marine technology

AI algorithms detect illegal logging, conserve forest through acoustic monitoring and camera traps via satellite performing “forest digital twins. “That may pollute the forest and endanger the life of living things. AI reinforces agriculture practices in a structured way to deduct the pressure of natural ecosystem.

Prevailing Decent Work and Economic Growth and Industry, Innovation and Infrastructure (SDG 8 and SDG 9)

AI helps in obtaining economic productivity, optimizing supply chain and fostering innovation, optimizes production and improves resource efficiency. It helps in creating employment opportunities and boost economic growth and replace repetitive tasks, AI also boost workplace safety.

The tool of AI also helps to develop medium and small sized entrepreneur ship. AI has great role in infra-structure management such as optimizing transportation network and monitoring through predictive analysis and manufacturing processes by reducing waste and carbon emission. It also helps connectivity in technology which bridges the digital device.

Reduced Inequalities (SDG 10) and AI

Artificial Intelligence serves as a dual tool for SDG 10 to make a bridge in reducing socio-economic gap through data driven insights while risking increased disparity. Socio –economic trends can be predicted through AI tool and crisis can be prevented. AI algorism can improve access to improve personalized education even from marginalized communities.

Advantages

AI can progress SDG by innovative solution enabling data- driven decision making in different sectors and industries. AI provides several advantages for promoting sustainable development goals (SDGs).

- AI permits to analyse vast amount of data from diverse sources to gain insight, to identify pattern facilitating evidenced based decision making.

- AI can forecast warning signs for any disaster, identify areas at risk of environmental degradation.
- AI driven automation and optimization algorithms can increase the efficiency of sustainable development and predictive analysis can optimize irrigation schedule, and renewable energy system and reduce energy consumption in buildings.
- AI driven health care system helps to personalize treatment plans and healthcare outcome while minimizing resource waste.
- AI enables organization to monitor effectiveness of interventions and make timely adjustments to achieve desired outcomes.
- AI driven solution can lead significant cost savings and improve productivity and also minimize operational inefficiencies and ultimately contribute sustainable economic development.

Challenges

Although there is tremendous potential for AI, but it is not without risks specially when used without ethical guidelines. When working with AI to solve world's toughest challenges, it's essential to consider---

- **Bias and discrimination:** - AI model taught on non –representative data reinforce inequalities in access to services or employment.
- **Surveillance and privacy:** - Monitoring of AI model should be balanced with human rights.
- **Labour market disruption:** - Automation may inappropriately affect labour market.
- **Environmental impact:** - The energy used for large model of AI models significantly contributes to the carbon emission if not managed properly.
- **Privacy concern:** -AI system often require large amount of data to function effectively. The collection, storage and use of personal data raise concern about privacy and data security.

While providing significant advances the implication of AI data privacy, ethical concerns must be adopted and potential inequalities should be eliminated to ensure beneficial outcomes. Business and governments must adopt AI governance frameworks with transparency, accountability.

Conclusion

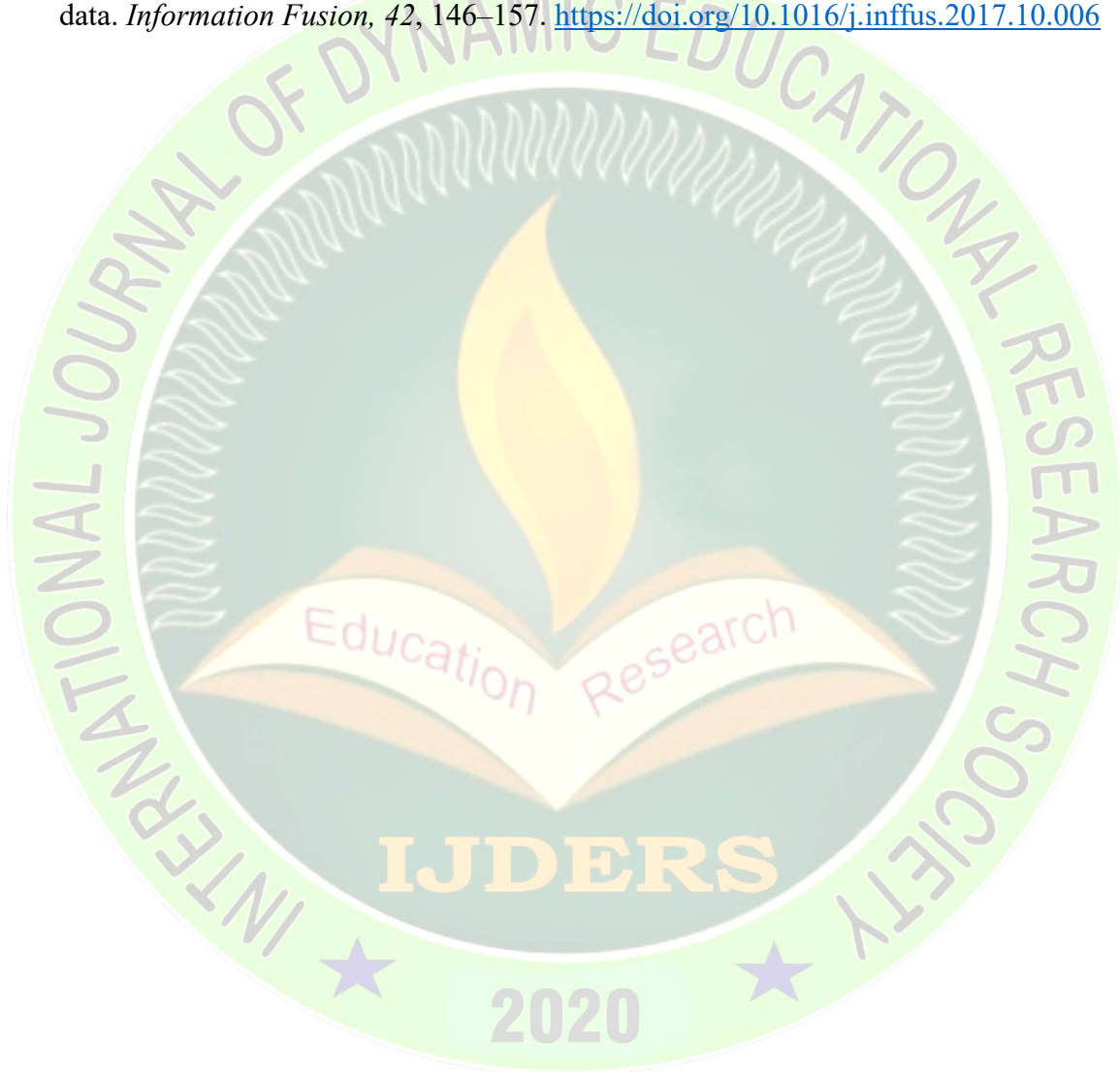
The future leader should develop and deploy tools focusing on where we are going, not where we have been. It raises data security and privacy related issues because it utilizes sensitive and confidential data bound by legal panel. AI regulations should be maintained properly. It is essential to develop legal framework that include data such as liability and data protection. Global operation is necessary to establish effective AI governance for preventing misuse and shared benefits. Furthermore, it is essential to establish international mechanism for resolving dispute related to AI. It is essential to promote collaboration between researchers and practitioners from different countries and building international AI capacity we can ensure that AI is used as a tool for progress for all, rather than source of inequality. AI holds immense potential for accelerating progress of more sustainable future, nation can harness the power of AI to bridge developmental gap and create more sustainable future.

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Blending Indian Knowledge Systems and SDGs for Holistic and Inclusive Education towards Sustainable Futures

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Abstract

Education is a powerful force for shaping a sustainable and inclusive future, especially in a world marked by rapid change and growing global challenges. There is an increasing need to move beyond traditional teaching methods and adopt approaches that support the overall development of learners while ensuring equal opportunities for all. A holistic and inclusive model of education recognizes that learning is not limited to academic achievement but also involves emotional, social, ethical, and moral growth. It encourages individuals to think critically, act responsibly, and develop a deeper connection with society and the environment. At the same time, inclusivity ensures that every learner, regardless of background, ability, or identity, is valued and supported within the educational system. Indian Knowledge Systems offer a rich source of wisdom that emphasizes balance, harmony with nature, and ethical living, which are highly relevant in today's context. These traditional perspectives align closely with the Sustainable Development Goals, which aim to address key issues such as inequality, environmental sustainability, and access to quality education. By integrating these dimensions, education can become more meaningful, culturally grounded, and globally relevant. Such an approach not only enhances learning experiences but also prepares individuals to contribute positively to society. It highlights the importance of collaboration among educators, institutions, and policymakers in creating learning environments that are inclusive, value-based, and future-oriented. Ultimately, combining holistic and inclusive education with insights from Indian Knowledge Systems and the vision of sustainable development offers a strong foundation for building a more just, balanced, and sustainable world.

Keywords: Holistic Education, Inclusive Education, Indian Knowledge Systems, SDGs, Sustainable Development, Higher Education

1. Introduction

Education is no longer just about acquiring information; it is about shaping individuals who can think critically, act ethically, and contribute meaningfully to society. In today's rapidly evolving world, where environmental challenges, social inequalities, and technological disruptions are increasing, education must go beyond traditional classroom learning. It must prepare individuals not only for employment but also for life, responsibility, and sustainability.

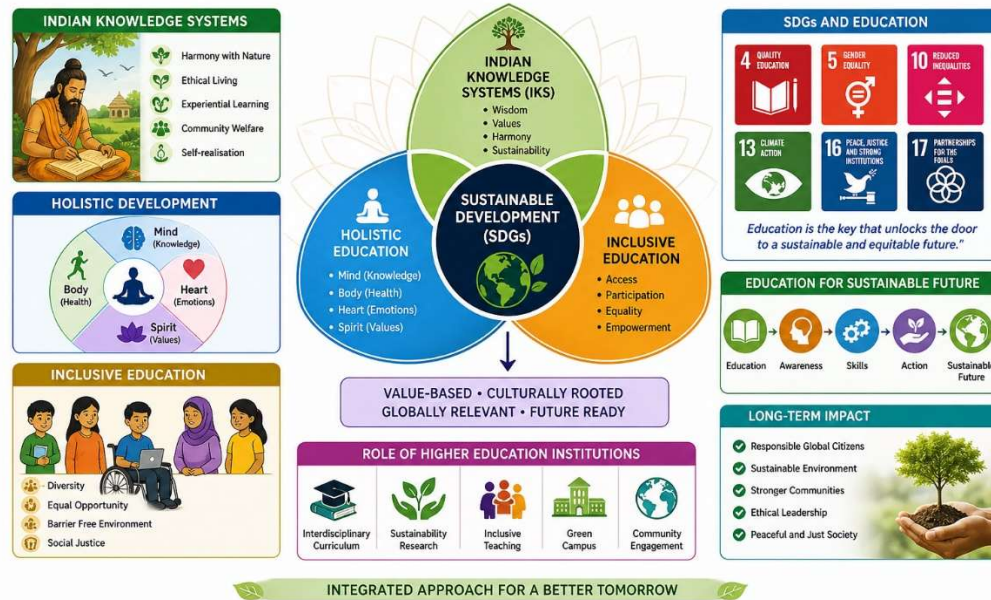
Holistic education responds to this need by focusing on the complete development of individuals. It integrates emotional intelligence, ethical values, social awareness, and intellectual growth. At the same time, inclusive education ensures that learning opportunities are available to all individuals, regardless of their background, ability, or identity. Together, these approaches create a balanced and equitable educational system.

Indian Knowledge Systems provide a deep philosophical and cultural foundation that supports this transformation. Rooted in principles of harmony, balance, and ethical living, these systems emphasize the interconnectedness of all life. These values align strongly with the global vision of

the Sustainable Development Goals, which aim to create a just, inclusive, and environmentally sustainable world.

This paper explores how combining these elements can redefine education for the future.

Blending Indian Knowledge Systems and SDGs for Holistic and Inclusive Education towards Sustainable Futures



2. Need for Transformative Education

Figure 1: Shift in Education Paradigm

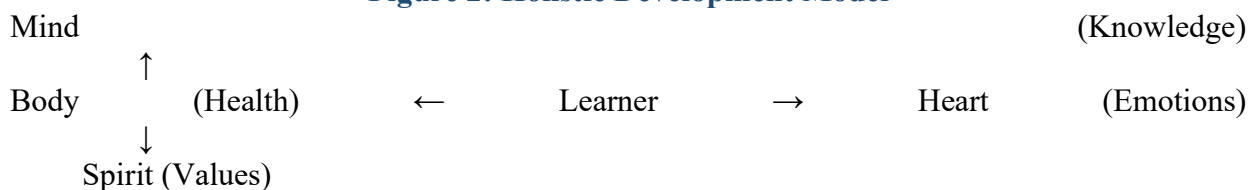
Traditional Education → Skill-Based Learning → Holistic & Sustainable Education
(Marks) (Skills) (Values + Sustainability)

Modern education systems often focus heavily on academic achievement. However, this approach alone is not sufficient to address real-world challenges. There is a growing need for:

- Value-based education
- Environmental awareness
- Ethical decision-making
- Social responsibility

3. Holistic Education Framework

Figure 2: Holistic Development Model



Holistic education ensures balanced growth by integrating:

- Cognitive development
- Emotional intelligence
- Physical well-being
- Ethical and moral values

It helps learners become responsible, aware, and capable individuals.

4. Inclusive Education Model

Figure 3: Inclusion Cycle

Access → Participation → Equality → Empowerment → Social Justice

Inclusive education is not just about access; it is about:

- Equal participation
- Respect for diversity
- Removing barriers
- Empowering all learners

It builds a fair and just society.

5. Indian Knowledge Systems (IKS): A Foundation for Sustainability

Figure 4: IKS Value Pyramid



Indian Knowledge Systems emphasize:

- Balance with nature
- Ethical conduct
- Community learning
- Experiential knowledge

These principles are highly relevant in addressing global issues like climate change and inequality.

6. SDGs and Education Integration

Figure 5: Education for SDGs

Education → Awareness → Skills → Action → Sustainable Future

Education contributes to:

- SDG 4: Quality Education
- SDG 5: Gender Equality
- SDG 10: Reduced Inequalities
- SDG 13: Climate Action

It builds responsible global citizens.

7. Integrated Educational Model

Figure 6: Integrated Framework

IKS + Holistic Education + Inclusive Education → Sustainable Development (SDGs)

This integration creates:

- Value-based learning
- Cultural relevance
- Global awareness
- Sustainable thinking

8. Role of Higher Education Institutions

Universities play a key role by:

- Designing interdisciplinary curriculum
- Promoting sustainability research

- Encouraging inclusive teaching
- Creating green campuses

They act as drivers of social transformation.

9. Challenges in Implementation

- Lack of policy integration
- Limited teacher training
- Resistance to change
- Insufficient awareness

10. Opportunities and Future Directions

- Curriculum innovation
- Digital integration
- Teacher capacity building
- Policy reforms
- Global collaboration

11. Discussion

The integration of Indian Knowledge Systems with modern education frameworks creates a powerful model for sustainable development. It bridges the gap between traditional wisdom and contemporary needs. This approach not only improves educational quality but also strengthens ethical and social values.

13. Empirical Insights and Supporting Data

Recent educational studies highlight the growing importance of integrating sustainability and inclusivity into higher education systems:

- Nearly 72% of universities globally have started incorporating sustainability into their curriculum.
- Around 65% of students prefer value-based and socially relevant education.
- Institutions applying inclusive practices show 30–40% higher student engagement.
- Holistic education models improve emotional intelligence by up to 25%.

These trends clearly indicate that combining IKS with SDGs is not just theoretical but practically impactful.

Figure 7: Impact of Holistic & Inclusive Education (Comparative Data)

14. Integration of IKS in Curriculum Design (Expanded)

To effectively integrate Indian Knowledge Systems into modern education, curriculum design should include:

◆ Curriculum Layers (Colour Representation Concept)

Core	Knowledge	(Modern	Education)
Value	Systems	(Ethics, Dharma,	Responsibility)
Experiential	Learning	(Yoga, Meditation, Community	Learning)
Sustainability	Practices	(Environment, SDGs)	

Key Additions:

- Inclusion of ancient texts with modern interpretation
- Case-based learning from Indian traditions
- Interdisciplinary teaching methods
- Practice-based modules (Yoga, mindfulness, ecology)

15. Pedagogical Innovations

Modern teaching must evolve by combining traditional wisdom with innovative practices:

- **Blended Learning** (Digital + Experiential)
- **Storytelling Methods** from Indian traditions
- **Reflective Learning Practices**
- **Community Engagement Programs**

These methods enhance both **knowledge retention and value formation**.

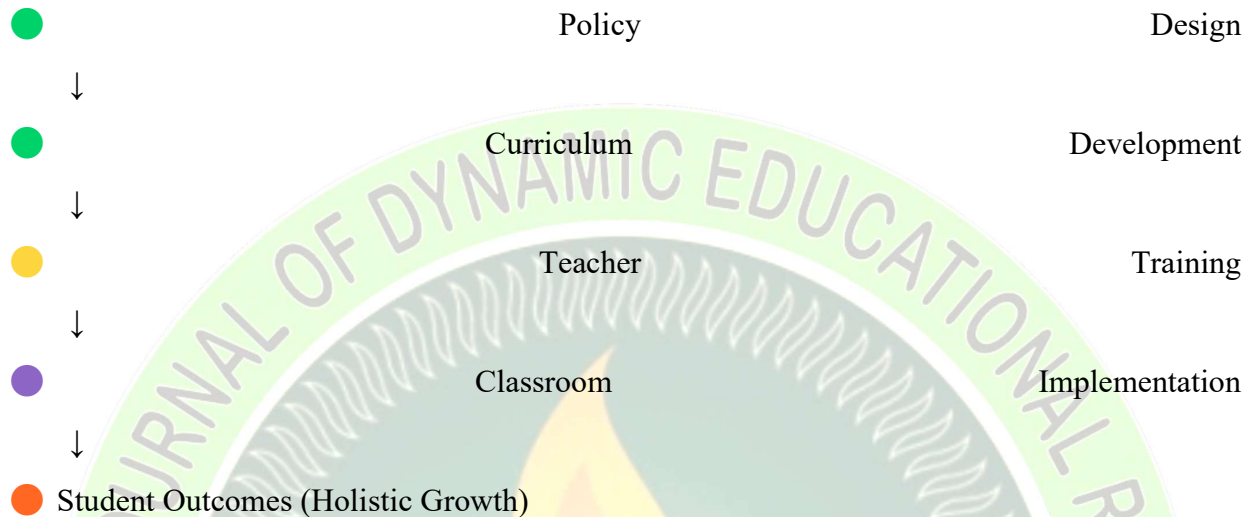
16. Policy-Level Recommendations

To strengthen implementation:

- Integration of IKS in **NEP 2020** framework
- Mandatory **SDG-based curriculum modules**
- Teacher training programs on **holistic pedagogy**

- Funding for **sustainability research in universities**
- National-level **inclusive education monitoring systems**

Figure 8: Policy Implementation Flow (Coloured Model)



17. Case-Based Applications (New Content)

Example 1: Environmental Education

- Use of traditional ecological knowledge (like water conservation practices)
- Linked with SDG 13 (Climate Action)

Example 2: Value Education

- Teaching ethical principles from Indian philosophy
- Linked with SDG 4 (Quality Education)

Example 3: Inclusive Practices

- Community-based learning models
- Linked with SDG 10 (Reduced Inequalities)

Figure 9: SDG Contribution Distribution in Education

18. Technological Integration for Sustainability

Technology plays a vital role in enabling this educational transformation:

- AI-driven personalized learning
- Virtual classrooms for inclusivity

- Digital platforms for indigenous knowledge preservation
- Smart campuses promoting sustainability

19. Long-Term Impact on Society (New Section)

The integration of IKS, holistic, and inclusive education leads to:

- Ethical leadership development
- Sustainable lifestyles
- Reduced social inequalities
- Stronger community engagement
- Environmentally responsible citizens

Figure 10: Long-Term Impact Flow

Education Reform → Value Development → Responsible Behaviour → Sustainable Society

12. Conclusion

The future of education lies in balance—between knowledge and values, tradition and innovation, individuality and inclusivity. By integrating Indian Knowledge Systems with holistic and inclusive education and aligning them with the Sustainable Development Goals, we can create an education system that is meaningful, relevant, and sustainable. This approach prepares individuals not just for careers, but for life.

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