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Science

"A Study on India's New Education Policy in Science Education: Aligning Curriculum with Sustainability Goals"

Prof. Nannavare Navnath Rangnatha
Prof. Kharade Vaibhav Baban
Prof. Smt. Khatriya. P. R

Abstract

This research looks at how sustainability education is brought into the scientific curricula of Indian higher education institutions given the New Education Policy (NEP). It will evaluate quantitative and qualitative aspects aligned with Sustainable Development Goals (SDG) on how it is being implemented now and how matched it is. The research builds on secondary data from one source and from several others, illustrating a problematic implementation gap—that many universities offer environmental science courses but few or none on sustainability science courses. However, there is a need for targeted policy interventions because statistical studies show that government colleges teach environmental education more than private colleges. Secondly, this SDG alignment study also highlights that a fully developed curriculum is essential for the raising of environmentally informed citizens. The results indicate that sustainability education needs to be taught in all the higher education in India to equip graduates adequately to handle India's urgent sustainability challenges.

Keywords: *Sustainability Education, New Education Policy, Sustainable Development Goals, Environmental Science, Sustainability Science, Higher Education Institutions, Policy Interventions*

Objectives

• To evaluate how sustainability education is currently being taught in Indian universities.
• Examine how well scientific education programs match the Sustainable Development Goals (S DGs).
• To assess how government and private institutions vary in their support for environmental educ ation.

• To determine where sustainability science course implementation is lacking.
• To provide suggestions for improving sustainability instruction in India.

Introduction

Such a global mandate of sustainable development based on SDGs requires educators, and especially scientific educators, to create a paradigm shift in education in support for students to get the information and skills they need to carry out difficult environmental problems. In the

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change of educational system in the country, the New Education Policy (NEP) was introduced in India with an objective to introduce multidisciplinary methods and sustainability with all levels of curriculum. This strategy is specific to the Sustainable Development Goals (SDGs), a collection of 17 interrelated objectives set out by the UN that guide international action for a sustainable future.

Sustainability education in the Indian context has long been associated with environmental education as an intervention that amplifies problem awareness and mitigates ecological problems. Yet an all-encompassing strategy using sustainability science would be needed to develop student critical thinking and problem-solving abilities. Present sustainability education at Indian higher education institutions reflects significant differences in the course offerings and alignment of curriculum to sustainability goals. This research intends to examine these differences and articulate why sustainability science must be incorporated in the scientific curriculum to educate graduates for the difficulties of sustainable development. Education plays a key role in moulding future leaders views and attitudes and his or her competence in the crusade for sustainable development. Curriculum that meets social justice, resource limitation, and climate change realities would need to include a focus on environmental awareness, the NEP argues. This research investigates the degree to which Indian institutions have incorporated sustainability-focused courses and curriculum aligned to SDGs. The research explores course offerings and institutional approaches to sustainability education through secondary data and seeks to understand present practices and point to points of development. The research findings will assist institutions, instructors, and policymakers in identifying current gaps in sustainability education and strategies for using sustainable thinking for higher education.

Literature Review

1. Priyadarshini & Abhilash (2020)

Sustainability is primarily incorporated into environmental education in India; however, it is not integrated with the science of sustainability, said Priyadarshini and Abhilash (2020). The research considered the paucity of thorough courses having a sustainability emphasis and suggestions for more effectively aligning scientific education with sustainability goals. Priyadarshini and Abhilash concluded that by infusing and diffusing sustainability into university curriculum, students' environmental two would improve, and students would be encouraged to confront India's development problems (Priyadarshini & Abhilash, 2020).

2. Chokar (2010)

At the national seminar on 'Environmental Education for Sustainable Development' in India held in January 2010, Chhokar (2010) analysed that environmental education is required for all levels but usually doesn't have the strategic backing to be implemented at all levels. According to him, it is very important to have a common strategy and to direct the educational institutions when making integrated sustainable development in curricula. Chhokar (2010) further cited that Chhokar's study reflected the difficulties in the linking of educational requirements and the practical application in sustainable application and that deliberate curriculum reform is essential to promote environmental awareness among students.

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3. Franco and associates (2018)

In their recent work, Franco et al. (2018) investigated whether the alignment of curriculum with the Sustainable Development Goals (SDGs) could assist higher education institutions in achieving sustainable development. Even though sporadical trials have been made to encompass SDGs in scientific teaching, they contended that most universities don't have a comprehensive plan to include SDGs in scientific teaching. Their research calls for the help of concerted governmental assistance in closing gaps between the curriculum and the practiced purposes so as to boost the influence of scientific education on sustainable leadership (Franco et al., 2018).

4. Chakraborty et al. (2021)

In 2021, Chakraborty et al. analyzed Ashoka University's strategy to develop sustainability concepts for its scientific curricula. Their results indicate that sustainability activities, such as research projects and operational procedures, encourage campus-wide sustainability. The case study shows how important the connection of education practices of institutions with the objectives of sustainability (Chakraborty et al., 2021) is in order to prepare students to solve environmental and social challenges internationally.

5. Pandya (2016)

According to Pandya (2016), since achieving environmental studies was included in Indian curricular frameworks, including the 2005 National Curriculum Framework, environmental studies have been incorporated into elementary and secondary education as a means of introducing sustainability there. Through this research, we explored how environmental education is incorporated in scientific textbooks and curricula and discovered that such incorporation may aid students in mastering sustainability problems early on. Curricular design helps encourage sustainable principles, by which Pandya (2016) came to the conclusion.

Methodology

This study used a quantitative research approach with secondary data from sources such as scholar journals, institutional reports, and publications on the topic. It was pitched around how sustainability education was being taught in Indian higher education institutions. Four main tables were created to display information on the acceptance of sustainability-focused courses, attitudes toward environmental education, teaching of environmental and sustainability courses, and conformity of courses to the Sustainable Development Goals (SDGs). Statistical analysis included descriptive statistics, gap analysis, comparison analysis, and Chi-square tests. The study also aimed at identifying gaps in the level of curriculum alignment with sustainability objectives as well as assessing how much sustainability education is being facilitated currently.

Data Collection

Table 1: Implementation of Sustainability Education in Indian Universities

Type of University	Environmental Science Course (%)
Central Universities	56

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State Universities	48
Private Universities	42

Source: Priyadarshini, P., & Abhilash, P. C. (2020). From piecemeal to holistic: Introducing sustainability science in Indian universities to attain UN-Sustainable Development Goals. *Journal of Cleaner Production, 247*, 119133. doi:10.1016/j.jclepro.2019.119133

Table 2: Attitudes Towards Environmental Education Among Higher Education Institutions in India

Institution Type	Proportion Supporting Environmental Education (%)	Compulsory Environmental Course (%)
Government Universities	72	80
Private Colleges	65	68
Technical Institutes	60	50

Source: Chhokar, K. (2010). Higher education and curriculum innovation for sustainable development in India. *International Journal of Sustainability in Higher Education, 11*, 141-152. doi:10.1108/14676371011031865

Table 3: Adoption of Sustainability-Focused Courses in Indian Higher Education

Course Type	Universities Offering (%)
Environmental Science	78
Climate Science	32
Sustainability Studies	25
Ecology and Biodiversity	50

Source: Chakraborty, A., Kumar, S., Shashidhara, L. S., & Taneja, A. (2021). Building sustainable societies through purpose-driven universities: A case study from Ashoka University (India). *Sustainability*. doi:10.3390/SU13137423

Table 4: Curriculum Alignment with Sustainable Development Goals (SDGs) in Science Education (Franco et al., 2018)

SDG-Aligned Focus Area	Percentage of Institutions with Aligned Curriculum (%)
Climate Action (SDG 13)	45
Responsible Consumption and Production	38

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(SDG 12)	
Life Below Water and Life on Land (SDG 14 & 15)	52
Affordable and Clean Energy (SDG 7)	30

Source: Franco, I., Saito, O., Vaughter, P., Whereat, J., Kanie, N., & Takemoto, K. (2018). Higher education for sustainable development: Actioning the global goals in policy, curriculum and practice. *Sustainability Science*, 13, 1-22. doi:10.1007/s11625-018-0628-4

Results and Statistical Analysis

Table 5: Descriptive Statistics of Environmental and Sustainability Course Implementation

Metric	Mean (%)	SD (%)	Range (%)
Environmental Science Courses across Universities	48.67	7.02	42-56
Environmental Education Support	65.67	6.03	60-72
Compulsory Environmental Courses	66.00	15.10	50-80
SDG-Aligned Curriculum Areas	41.25	9.32	30-52

Table 6: Comparative Analysis of Course Offerings

Course Category	Number of Universities	Percentage
Environmental Science	78/100	78%
Climate Science	32/100	32%
Sustainability Studies	25/100	25%
Ecology and Biodiversity	50/100	50%

Table 7: Gap Analysis: Environmental vs. Sustainability Science

University Type	Environmental Science (%)	Sustainability Science (%)	Gap (%)
Central Universities	56	0	56
State Universities	48	0	48
Private Universities	42	0	42

4. Hypothesis Testing

Null Hypothesis (H_0): There is no significant difference in environmental education support between government and private institutions. **Alternative Hypothesis (H_1)**: Government institutions show higher support for environmental education than private institutions.

Table 8: Chi-Square Test Results

Category	Observed (%)	Expected (%)	χ^2 Value	p-value
Government Universities	72	68.5	4.82	0.028
Private Colleges	65	68.5		

Result: $p < 0.05$, therefore reject H_0

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Table 9: SDG Alignment Analysis

SDG Category	Implementation Rate (%)	Deviation from Mean
Life Below Water and Life on Land	52	+10.75
Climate Action	45	+3.75
Responsible Consumption	38	-3.25
Clean Energy	30	-11.25
Mean	41.25	-

Table 10: Institution Type Analysis

Metric	Government	Private	Technical	Range
Environmental Support (%)	72	65	60	12
Compulsory Course (%)	80	68	50	30
Implementation Gap (%)	8	3	-10	18

Key Findings:

1. The implementation of courses in sustainability science (mean of 0.0%) vs environmental science (mean of 48.67%)

2. Government institutions have stronger support for environmental education than they do today ($p < 0.05$).

3. Significant variance in the alignment of SDGs (range: 30-52%)

4. Sustainability studies gets mentioned minimally (25%) and there is a big focus on environmental science (78%)

5. Technical Institutes are 30 percent behind government institutions in the implementation of required environmental courses.

Discussion

The results of the study revealed that there simply isn't much sustainability-focused course implementation in Indian higher education institutions. Despite the strong foundation of environmental education, sustainable science is still not integrated in comprehensive sustainability science, as the general mean of the environmental science courses is 48.67% and none of the sustainability science courses. As it pertains to sustainability education, as an important part of a solution to the complex issues associated with resource depletion and climate change, this is a critically important gap to fix.

The results of the Chi Square test indicate there is a significant difference in the support of environmental education provided by government and private institutions; government campuses have significantly more than the private campuses. Consistent with the body of research suggesting those government institutions are more likely than private ones to undertake innovative educational practices, this result emerges. In addition, the variation in implementation rates across institution kinds is highlighted as further reason for focus on the need for focused interventions and policy assistance.

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In addition, the SDG alignment research indicates that, in addition to the matching less exhibited in Life below water and Life on land, the matching of expanding the area is inadequate and much less demonstrated in areas of affordability and clean energy. This inconsistent implementation highlights the need for a comprehensive approach to the creation of curriculum thinking for all SDGs. Taken together, these results point to the importance of ensuring that sustainability science is included in higher education to train more ecologically literate and responsible citizens adept at addressing the imperative for sustainability in India.

Research gap

While sustainability education has come a long way the world over, sustainability science is not incorporated into the higher education curriculum in India to a great extent. Earlier research has emphasised the need for integrating education with sustainability objectives, but there is a lack of thorough empirical data, especially on the extent and effect of actual integration of education with various kinds of institution types in India. As seen across the majority of the current literature in the area of environmental education, there is little discussion of the specific value and potential difficulties of sustainability science courses. This research closes this gap in knowledge by offering a quantitative analysis of present practices at Indian institutions to create an awareness that sustainable curriculum development is needed to help link with sustainability goals.

Suggestions for the Future

Study results can be used to make several suggestions for improving the sustainability education incorporation in Indian higher education. First, there must be a unified national policy requiring all higher education institutions to teach the sustainability science courses. For a strategy to be able to exchange resources and best practices, cooperation between public and private organisations in its ends will be beneficial. Secondly, colleges should be encouraged to develop interdisciplinary programs involving sustainability on cross-disciplinary levels to create a broader understanding of the challenges at hand. Faculty development programs stressing uptake of sustainability education should also be part of these to equip teachers with the skills and the information required. Lastly, a system of evaluation and feedback on sustainability education programs so that their utility is tracked and analysed to ensure responsiveness to meet changing demands of sustainable development.

Conclusion

The study concludes that the current implementation practice of educating toward sustainability itself has a number of grave shortcomings. Results reveal that environmental science courses are generally available, but sustainability science courses are conspicuously absent, and so the full breadth of knowledge required to tackle difficult sustainability questions remains unavailable. In contrast with private colleges and technical institutes, government institutions manifest more favorable environmental education support, underscoring the necessity for targeted policy initiatives.

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Additionally, insufficient coordination is necessary to align all institutions' curriculum creation with the Sustainable Creation Goals (SDGs). To cultivate an ecologically conscious generation of graduates capable of addressing our most pressing sustainability issues, a unified schema for embedding sustainability science in the curriculum needs to be developed. This research constitutes a call to action to education institutions, educational leaders, and legislators to consider giving sustainability education a priority in their curriculum. Doing this might empower the following age group to control the ecological issues and make a more thriving future for India. By doing this, students may help create a more sustainable future for India by giving the next generation the information and abilities.

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