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## FROM LITERACY TO SUSTAINABILITY: THE ROLE OF INDIAN EDUCATION INSTITUTIONS IN ACHIEVING SDG 4

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### ABSTRACT

*Sustainable Development Goal 4 (SDG 4), aims to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all,” has become a transformative framework for global education systems. In India, education institutions play a crucial role in operationalizing SDG 4 by integrating employment-relevant skills, strengthening foundational literacy and numeracy, and advancing Education for Sustainable Development (ESD) and global citizenship. SDG 4 encompasses multiple targets that extend beyond access to education, focusing on quality, inclusivity, and lifelong learning. This article examines how all kinds of Indian institutions are embedding SDG 4 through curriculum reforms, research initiatives, and community outreach. Drawing upon policy documents such as the National Education Policy (NEP) 2020, UNESCO reports, and institutional practices, the study highlights achievements, challenges, and future pathways. The findings suggest that while India has made notable progress in access and gender parity, significant gaps remain in learning outcomes, skill alignment, and sustainability education.*

**KEYWORDS:** Sustainable Development Goal 4 (SDG 4), Lifelong Learning, National Education Policy (NEP), UNESCO, literacy, Millennium Development Goals (MDGs) and numeracy.

### INTRODUCTION

It is commonly acknowledged that education is essential to sustainable development. The Millennium Development Goals (MDGs) were introduced in September of 2000 and preceded the Sustainable Development Goals (SDGs). The MDGs were in effect from 2000 to 2015. There are eight goals in the MDGs. The MDG objective was decided to be accomplished in 2015. Nandhini

(2025). Subsequently, as part of the 2030 Agenda for Sustainable Development, all United Nations Member States accepted the Sustainable Development Goals (SDGs), a universal set of 17 interrelated global goals, in 2015. By addressing the world's most important issues by 2030, these objectives offer a common blueprint for peace, prosperity, and environmental sustainability. The SDGs expand on the preceding Millennium Development Goals (MDGs) by incorporating social inclusion, economic growth, and environmental protection. They understand that combating climate change, safeguarding ecosystems, and guaranteeing sustainable patterns of production and consumption must go hand in hand with eradicating poverty and enhancing human well-being.

In order to achieve a sustainable and inclusive future by 2030, the United Nations approved the Sustainable Development Goals (SDGs) in 2015. They consist of 17 interrelated global objectives. Together, these objectives tackle a number of significant global issues, including as the elimination of poverty (No Poverty), food security (Zero Hunger), gender equality, access to clean water and sanitation, health and well-being, and high-quality education. They also place a strong emphasis on infrastructure and innovation, decreasing inequality, and sustainable economic growth and employment (Decent Work). With objectives focusing on climate action, clean energy, responsible consumerism, and the preservation of land and marine ecosystems, environmental sustainability is a major priority. The SDGs also emphasize the necessity of international cooperation through partnerships to guarantee successful implementation while promoting just and peaceful communities backed by robust institutions. Under the tenet of "leaving no one behind," these objectives collectively offer a thorough framework that integrates the social, economic, and environmental aspects of development.



Source: Homestead Agroforestry and SDG

### SDG 1: No Poverty

It aims to end poverty in all its forms everywhere by 2030. It focuses on eradicating extreme poverty, defined as living below \$2.15 per day (adjusted for purchasing power parity), which has declined significantly since 1990 but persists in regions like sub-Saharan Africa. Key targets include implementing social protection systems for all, ensuring equal rights to economic resources, and building resilience to climate-related events and disasters. Progress involves national definitions of poverty, with indicators tracking proportions below poverty lines by sex, age, and location. Challenges remain in conflict zones and amid economic shocks, requiring integrated policies for sustainable livelihoods.

### SDG 2: Zero Hunger

It seeks to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture. Despite halved undernourishment since 1990, over 700 million people faced hunger in

recent years, exacerbated by conflicts and climate change. Targets include doubling small-scale farmers' productivity, ensuring sustainable food production systems, and maintaining genetic diversity of seeds and plants. It addresses malnutrition across life stages, from infant stunting to adult obesity. Investments in resilient agriculture and rural infrastructure are critical for progress.

### **SDG 3: Good Health and Well-Being**

It promotes healthy lives and well-being for all ages. It targets reducing maternal mortality to below 70 per 100,000 live births, ending epidemics like AIDS and malaria, and achieving universal health coverage. Life expectancy has risen globally, but non-communicable diseases and mental health issues pose new challenges. Key efforts include vaccination drives, tobacco control, and reducing road traffic deaths. Pandemic responses highlighted the need for equitable access to vaccines and healthcare infrastructure.

### **SDG 4: Quality Education**

It ensures inclusive, equitable quality education and lifelong learning opportunities. It aims for universal primary/secondary education, vocational skills, and scholarships for developing countries. Over 250 million children remain out of school, with gender disparities in regions like South Asia. Targets include eliminating gender disparities and enhancing global literacy rates. Teacher training and digital learning tools are vital amid disruptions like COVID-19.

### **SDG 5: Gender Equality**

It achieves gender equality and empowers women and girls. It addresses discriminatory laws, violence, and unequal pay, with women holding only 27% of parliamentary seats globally. Targets include ending child marriage, ensuring equal rights to resources, and promoting shared domestic responsibilities. Progress varies, with Nordic countries leading, but harmful practices persist in 117 countries. Economic empowerment through education and leadership roles drives broader development.

### **SDG 6: Clean Water and Sanitation**

It ensures availability and sustainable management of water and sanitation. Nearly 2 billion lack safe drinking water, and 3.6 billion lack safe sanitation. Targets include halving the proportion without access, improving water quality, and protecting ecosystems. Wastewater reuse and transboundary cooperation are emphasized. Climate change intensifies water scarcity, demanding efficient use and pollution control.

### **SDG 7: Affordable and Clean Energy**

It ensures universal access to affordable, reliable, sustainable, and modern energy. Renewable energy share grew to 30% of electricity in 2023, but 675 million lack electricity. Targets include doubling energy efficiency rates and expanding renewables. Investments in solar and wind, plus grid modernization, are key to reducing reliance on fossil fuels.

### **SDG 8: Decent Work and Economic Growth**

It promotes sustained, inclusive economic growth, full employment, and decent work. It targets 7% GDP growth in least developed countries and youth employment. Global unemployment hovers at 5%, with informal jobs dominating in developing nations. Eradicating forced labor and supporting SMEs foster resilience.

### **SDG 9: Industry, Innovation, and Infrastructure**

It builds resilient infrastructure, promotes inclusive industrialization, and fosters innovation. It aims to enhance connectivity in landlocked and small islands via technology. R&D spending lags in low-income countries, hindering productivity. Sustainable industrialization supports other goals like poverty reduction.

### **SDG 10: Reduced Inequalities**

It reduces inequality within and among countries. Income share of the bottom 40% should rise faster than average. Targets include remittances at 3% GDP, special treatment for developing countries, and migration policies. Global inequality persists, with fiscal policies key to redistribution.

### **SDG 11: Sustainable Cities and Communities**

It makes cities inclusive, safe, resilient, and sustainable. Rapid urbanization strains housing and transport for 55% of the world population. Targets reduce slum dwellers, air pollution, and disaster impacts. Green urban planning enhances liveability.

#### **SDG 12: Responsible Consumption and Production**

It ensures sustainable consumption and production patterns. It targets sustainable management of natural resources and waste reduction. Global material footprint tripled since 1970, demanding circular economies and sustainable tourism.

#### **SDG 13: Climate Action**

It takes urgent action on climate change. It integrates measures into policies and improves education on mitigation. Emissions must peak by 2025 for 1.5°C limits; vulnerabilities in small islands demand resilience.

#### **SDG 14: Life Below Water**

It conserves oceans, seas, and marine resources. Targets end overfishing, protect 10% coastal areas, and cut marine pollution by 2025. Ocean acidification threatens biodiversity and economies.

#### **SDG 15: Life on Land**

It protects terrestrial ecosystems, combats desertification, halts biodiversity loss. Targets sustainable forests end poaching, and invasive species control. Deforestation rates alarm at 10 million hectares yearly.

#### **SDG 16: Peace, Justice, and Strong Institutions**

It promotes peaceful societies, inclusive institutions, justice. It reduces violence, bribery, trafficking. Conflicts displace 100 million; rule of law essential.

#### **SDG 17: Partnerships for the Goals**

It strengthens global partnerships for sustainable development. Adopted in 2015, it calls for multi-stakeholder collaboration, including finance mobilization, technology transfer, and capacity-building. Official development assistance aids growth, while trade and debt policies support least developed countries. North-South, South-South cooperation enhances data and systemic issues like debt sustainability. Multi-stakeholder efforts ensure no one is left behind by 2030. 17 SDGs form an interconnected framework adopted by the UN in 2015, targeting 2030 for poverty eradication, planetary protection, and prosperity. Progress varies, with synergies like health-energy links vital; partnerships (SDG 17) enable implementation amid challenges like conflicts and climate crises.

#### **REVIEW OF LITERATURE**

After learning about each and every SDG objective, we can see that education is one of the most important or crucial for reaching all of the goals by 2030. The majority of the objectives are related to education (Agbedahin 2019). Therefore, the primary focus of this paper is Sustainable Development Goal 4: Quality Education, Ensure Education Accessible to Everyone, Fairness in Education by Offering Effective, Relevant Education, Promoting Continuous Education throughout Life, Adapting to Changing Needs and Challenges for Everyone. SDG 4 states that all children, regardless of gender, caste, religion, or membership in a marginalized community or group, must have free and obligatory access to education from elementary school through higher education by 2030 (Saini et al., 2022, 2023). SDG Goal 4 consists of ten key aims that prioritize children, youth, and adults and emphasize on going education (Boeren, 2019). In order to promote economic independence and enhance people's quality of life, SDG target 4 also states that students, including boys and girls, shall have access to vocational education and skill development for employment and occupations. This aim represents adult literacy and mathematical proficiency since it encourages lifelong learning. Even the most recent Education Policy (NEP 2020) emphasizes giving all students access to a wide range of knowledge and vocational skills. The goal of our country has always been to educate every kid (Pandey, 2018).

Achieving SDG 4 depends on India, which has one of the biggest higher education systems in the world. Over 40 million students in higher education are served by the nation's educational system, which is vital to the development of human capital. Universities in India are increasingly aligning their academic and research frameworks with SDG 4 targets, particularly: Building

### Employment Skills (Target 4.4)

Universities prioritize practical training via skill hubs and industry ties, addressing employability gaps where only 47% of graduates are job-ready. IIT Madras integrates sustainability tech courses, producing experts in renewable energy; its School of Sustainability links research to jobs, with alumni in NetZero projects. With 90% placement rates in sustainable energy companies for its biotech programs, Saveetha Institute excels in SDG 7. It connects to Universal Literacy and Numeracy (Target 4.6), ESD and Global Citizenship (Target 4.7) and ESD promotes sustainability values.

## RESEARCH METHODOLOGY

### SDG 4's Conceptual Framework

The National Education Policy (NEP) 2020 is the main force behind the significant changes being made to the Indian higher education system in order to bring it into line with Sustainable Development Goal 4 (SDG 4). Indian colleges now prioritize community engagement, digital inclusion, and transdisciplinary research over traditional classroom instruction. The objective consists of ensuring free and equitable education: Through financial assistance programs and digital democratization, Indian colleges are tackling equity.

### RESEARCH OBJECTIVES

- To understand SDG 17 and its intention in fostering global partnerships for sustainable development.
- To know details of SDG 4 and the role of Indian education institutions in promoting inclusive quality education and lifelong learning.
- To get practical ideas from real-time cases in SDG 4 implementation and identify associated challenges.

### RESEARCH DESIGN

The study follows a descriptive and analytical approach, aiming to explore how Indian education institutions integrate SDG 4 through curriculum, research, and community engagement. It does not involve experimental or survey-based methods but relies on interpretive analysis with few real cases.

#### Data Sources

The research is based on secondary data, collected from credible and authoritative sources, including:

- Government policy documents such as the National Education Policy (NEP) 2020
- Reports from international organizations like UNESCO and the United Nations
- Research articles, journals, and conference papers
- Institutional reports and official university publications
- Online educational platforms and official SDG-related websites

These sources provide comprehensive insights into policy frameworks, implementation strategies, and institutional practices.

#### Data Collection Method

Data were collected through document analysis of policy reports and academic literature. Content analysis of university initiatives, programs, and case examples and review of existing statistical data and reports related to literacy, employability, and sustainability education.

### SCOPE OF THE STUDY

The study focuses on Indian education institutions and their coverage of policy implementation, curriculum reforms, and outreach initiatives. It emphasizes recent developments post-NEP 2020.

### LIMITATIONS OF THE STUDY

Despite its comprehensive approach, the study has certain limitations:

The study depends on secondary data which may limit access to real-time or ground-level data as well it reflects institutional or policy-level perspectives rather than individual experiences. It also with lack of primary empirical evidence like no surveys, interviews, or fieldwork were

conducted and the study does not capture student, faculty, or stakeholder perceptions directly. Indian education is highly diverse (central, state, private institutions) so that the findings may not equally apply to all types of institutions, especially rural or under-resourced institutions

## **DISCUSSIONS**

### **Indian Higher Education Landscape and SDG 4**

India's higher education system encompasses central universities, state universities, private institutions, and institutes of national importance. Policy frameworks such as the National Education Policy (NEP) 2020 emphasize:

#### **Multidisciplinary Education**

The NEP 2020 advocates for a flexible, multi-layered approach that breaks the barriers between arts, sciences, and professional streams. A four-year undergraduate program with numerous entry and departure choices is becoming more and more popular in Indian colleges, enabling students to mix a variety of topics like physics and music or economics and data science. The goal of this holistic approach is to develop all human potential—intellectual, artistic, social, physical, emotional, and moral—so that graduates are well-rounded people who can approach challenging real-world issues from a variety of angles.

#### **Skill-based Learning**

To bridge the gap between academic theory and industry requirements, there is a renewed focus on vocational integration and hands-on training. In partnership with business partners, universities are implementing the National Skills Qualifications Framework (NSQF) into their curricula and providing short-term certification courses and B.Voc degrees. The Indian higher education system is transitioning from rote memorization to competency-based education by stressing "learning by doing" and requiring internships. This ensures that students have the practical competence needed for the modern workforce.

#### **Digital Literacy**

Digital transformation is at the heart of making education equitable and accessible across India's vast geography. Regardless of where they live, students may access top-notch resources from prestigious universities thanks to the promotion of platforms like SWAYAM, DIKSHA, and the Academic Bank of Credits (ABC). In order to ensure that students are competent in data handling, online collaboration, and the ethical use of technology all crucial for navigating the Fourth Industrial Revolution universities are also incorporating digital literacy into every subject.

#### **Sustainability Integration**

Indian institutions are increasingly acting as catalysts for environmental stewardship and social responsibility. Beyond the mandatory environmental studies courses mandated by the University Grants Commission (UGC), universities are integrating Education for Sustainable Development (ESD) into their core research and campus operations. This involves adopting "Green Campus" protocols such as solar energy harvesting and zero-waste management and engaging in community outreach programs like Unnat Bharat Abhiyan, where students apply their knowledge to solve sustainability challenges in rural India, thereby fostering global citizenship. The NEP explicitly aligns with SDG 4 by promoting holistic and flexible education systems. UNESCO reports indicate that India has made significant progress in improving access to education and gender parity, yet challenges persist in learning outcomes and higher education participation.

#### **Embedding Employment-Relevant Skills in Indian Education**

Indian higher education is undergoing a transformative shift from rote-learning-centric, theoretical models to skill-oriented curricula, driven by national policies like the National Education Policy (NEP) 2020. In light of growing young unemployment and global competition, this evolution places a higher priority on employability, innovation, and alignment with industry expectations (Ministry of Education, 2020). The Choice-Based Credit System (CBCS), which was enforced countrywide in 2015 by the University Grants Commission (UGC), is a key component of these reforms. Incorporating elective skill-enhancement modules (such as vocational training in data analytics or digital marketing) and granting credits based on learning outcomes rather than

attendance, CBCS gives students choice in choosing courses across disciplines (UGC, 2015). This approach lessens the rigidity of conventional curricula while promoting transdisciplinary learning.

Courses for skill development are integrated into CBCS through platforms such as the National Skills Qualification Framework (NSQF). These short-term, modular programs incorporate practical training in industries including IT, manufacturing, and healthcare and are frequently accredited by the National Skill Development Corporation (NSDC). For example, more than 1,200 universities currently provide NSQF-aligned courses, reaching millions of students and closing the skills gap between academia and industry (NSDC, 2023).

Through public-private partnerships, industry-integrated programs drive this tendency even more. Internships, real-world initiatives, and co-created curricula with companies like Tata and Infosys are made possible by programs like AICTE's University Innovation & Incubation Clusters and dual-degree apprenticeships under the Skill India Mission (AICTE, 2022). The impact of the reforms is highlighted by evidence from a UGC research that CBCS adopters claim 20–30% greater graduate employment rates (UGC, 2021).

These changes signal a paradigm shift toward outcome-based education, though challenges like faculty training and infrastructure persist. Institutions such as the Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), and central universities have introduced: Elite Institutions' Initiatives and Industry-Academia Collaborations

In line with UN Sustainable Development Goal (SDG) Target 4.4, which calls for significantly increasing the number of youth with relevant technical and vocational skills for employment by 2030, prestigious Indian institutions like the Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), and central universities are leading skill-building reforms through targeted programs (United Nations, 2015). For instance, IITs have established incubation facilities like the Research Park at IIT Madras, which provide entrepreneurship programs like E-Cell bootcamps and start-up accelerators that have supported more than 500 businesses since 2016 (IIT Madras, 2024). Similar to this, IIMs incorporate AI and data analytics courses through required industry internships and specialty MBAs (like IIM Bangalore's Business Analytics program), with 90% of students landing jobs through on-campus drives (IIM Bangalore, 2023).

These initiatives complement larger industry-academia partnerships, which are essential to upgrading higher education in India. Important examples include joint research projects financed by the Atal Innovation Mission (AIM), skill certification programs co-developed with organizations like NASSCOM (e.g., Future Skills PRIME initiative), and campus recruitment training through partnerships with companies like Google and Deloitte. This is demonstrated by IIT Delhi's collaboration with Microsoft on AI laboratories, which produced collaborative patents and qualified graduates (NITI Aayog, 2022). By promoting practical abilities and minimizing skill mismatches, such efforts directly address India's employability gap, where just 45% of graduates are prepared for the workforce (Aspiring Minds, 2021). Although expanding to tier-2/3 colleges is still necessary for fair impact, data indicates that these partnerships improve graduate outcomes, with participating institutions reporting 25–40% greater placement rates.

### **Strengthening Foundational Literacy and Numeracy**

#### **Importance of Foundational Skills**

Foundational literacy and numeracy are critical for lifelong learning. SDG Target 4.6 aims to ensure that all youth and a substantial proportion of adults achieve literacy and numeracy by 2030.

#### **Universities' Role in Foundational Education**

While foundational education concentrating on literacy, numeracy, and basic skills primarily occurs at the school level, Indian universities play a pivotal supportive role through teacher education programs, community initiatives and pedagogical research. This line up with national goals under the National Education Policy (NEP) 2020 to strengthen the education ecosystem holistically (Ministry of Education, 2020).

Teacher education programs form the mainstay, with institutions like Regional Institutes of

Education (RIEs) and state universities offering B.Ed., M.Ed., and joined programs accredited by the National Council for Teacher Education (NCTE). These train over 2.5 million educators annually, emphasizing competency-based pedagogies like activity-based learning (NCTE, 2022). For instance, Delhi University's B.Ed. curriculum now integrates NEP-mandated multidisciplinary approaches, improving teacher readiness for Foundational Stage (ages 3-8) reforms.

Universities also advance research in pedagogy, constructing evidence-based innovations. Central universities like Jawaharlal Nehru University (JNU) and IITs conduct studies on AI-driven personalized learning and multilingual education, influencing policies like NIPUN Bharat (National Initiative for Proficiency in Reading with Understanding and Numeracy). A UGC-funded meta-analysis revealed pedagogy research from universities boosted student learning outcomes by 15-20% in pilot schools (UGC, 2023).

Complementing these are community literacy initiatives, such as IGNOU's adult literacy campaigns and IIT Kanpur's "Mission Gyan" program, which deploys student volunteers for rural digital literacy drives, reaching 50,000 and more learners since 2021 (IGNOU, 2024). These efforts address India's 26% adult illiteracy rate, particularly in underserved areas. By bridging school-university divides, these contributions enhance foundational learning equity and quality.

### **Education for Sustainable Development (ESD) and Global Citizenship**

#### **Integration into Curriculum**

Indian universities have progressively embedded sustainability into their academic curricula, reflecting a systemic shift toward holistic and future-oriented education. Many undergraduate programs now require environmental studies, guaranteeing that all students gain a basic understanding of ecological challenges. Additionally, a variety of academic fields, including management, engineering, and social sciences, are introducing specialist courses on climate change, biodiversity conservation, and sustainable business practices. This approach is significantly supported by the National Education Policy 2020 (NEP 2020), which establishes sustainable development and environmental awareness as fundamental educational priority. It promotes interdisciplinary teaching methods that include sustainability ideas into instruction, learning, and evaluation, giving students the skills, they need to handle challenging global issues.

#### **Research and Innovation**

Beyond curriculum development, Indian universities are playing a critical role in advancing sustainability through research and innovation. Academic institutions are actively involved in important fields like sustainable farming practices, climate change adaptation techniques, and renewable energy technology. Research projects frequently entail partnerships with international organizations, business partners, and government agencies, which increases the significance and influence of academic work. Additionally, universities are setting up specialized research facilities and innovation hubs with an emphasis on sustainable solutions and green technologies. In addition to advancing science, these initiatives support national priorities and international sustainability frameworks, such as the Sustainable Development Goals (SDGs) of the United Nations. The expanding corpus of research results encourages scalable solutions for environmental and socioeconomic problems and supports evidence-based policymaking.

#### **Cultural and Ethical Dimensions**

The incorporation of sustainability in higher education encompasses cultural and ethical aspects in addition to scientific and technological ones. The significance of culture and arts education in encouraging students' creativity, empathy, and critical thinking is emphasized in the UNESCO State of Education Report for India. To foster a better understanding of sustainability, universities are increasingly integrating value-based education, indigenous knowledge systems, and arts-based pedagogies. These methods help students understand the interdependence of human and natural systems, ethical responsibility, and cultural diversity. Higher education institutions help create citizens who are socially and environmentally responsible by fostering these qualities.

#### **Global Citizenship Education**

Global Citizenship Education (GCED) has emerged as a vital component of sustainability-

oriented education in Indian universities. By encouraging human rights awareness, respect for cultural variety, and a dedication to peace and non-violence, it seeks to equip pupils to navigate an increasingly linked world. Universities are encouraging students to have a global perspective through curricular integration, workshops, exchange programs, and community participation projects. Additionally, GCED promotes critical thinking about global concerns like sustainable development, climate justice, and inequality. Higher education institutions are essential to the development of inclusive and sustainable societies because they foster knowledgeable, compassionate, and engaged global citizens.

### **Outreach and Community Engagement**

Indian universities are increasingly extending their role beyond academic instruction to actively contribute to community development and societal transformation. Outreach and engagement initiatives serve as vital mechanisms for translating academic knowledge into practical solutions, particularly in underserved and rural areas. These efforts align closely with the broader objectives of inclusive and equitable quality education, as emphasized under SDG 4.

### **Extension Activities**

School led and University led extension activities in India, via programs like NSS and Unnat Bharat Abhiyan, connect students and professors with local communities for reciprocal learning and sustainable development. Institutions adopt villages for need-based interventions in digital literacy, sustainable farming, local business, and sanitation, offering students hands on experience. Literacy drives include adult education, remedial classes, and awareness campaigns to boost access for marginalized groups, aligning with SDG 4's universal literacy goals.

Environmental efforts tree planting, waste management, water conservation, and climate awareness promote local sustainability and civic responsibility, positioning universities as drivers of social change. Lifelong Learning Initiatives

A key component of inclusive education is lifelong learning, which Indian colleges are actively promoting. The Indira Gandhi National Open University (IGNOU) and other open universities and remote learning establishments offer flexible and accessible learning opportunities to a variety of groups, including non-traditional learners, working professionals, and rural populations.

Through online platforms, study centers, and blended learning approaches, these universities provide a broad range of programs, from graduate degrees to vocational training. They guarantee that education is an ongoing and inclusive process by eliminating obstacles based on age, location, and socioeconomic position.

Initiatives for lifelong learning also promote employability, skill development, and personal enrichment, all of which greatly contribute to sustainable development. In alignment with SDG 4, these efforts promote equitable access to education and empower individuals to adapt to changing socio-economic conditions.

### **Case Studies**

#### **SDG 4**

This article examines two illustrative cases of Sustainable Development Goal 4 (SDG 4) practices, highlighting efforts to ensure inclusive and equitable quality education at both the international and national levels. The first case presents an international perspective, showcasing how global initiatives and cross-border collaborations have contributed to advancing educational access, quality, and lifelong learning opportunities. The second case focuses on the national context, demonstrating how SDG 4 principles are translated into country-specific policies and institutional practices. Together, these cases provide a comparative understanding of how SDG 4 is operationalized across different contexts, offering insights into effective strategies, challenges, and outcomes in promoting sustainable and inclusive education systems.

Kenneth Kwok from Hong Kong is a founder and an educator at KIDs for SDGs, an organization that empowers youth “to help the world build back broader, greener, and better through the UN Sustainable Development Goals (SDGs) framework.” During the pandemic, KIDs for SDGs

co-curated the inaugural UNITAR Youth Ambassador Asia Pacific Programme. In Hong Kong, there has not been enough emphasis on the SDGs in the academic curriculum. This is one of the reasons that Kenneth, who received the World Economic Forum UpLink Top Innovator recognition for his SDG work, decided to join the Global Schools Program. By becoming an Advocate, Kenneth gained a platform to speak to schools, governments, and corporations, and to raise awareness, beginning with youth. Kenneth believes that education entails not only studying independently at school, but also researching, collaborating, building a community, and partnering to find passions and to ideate solutions. During his advocacy, he initiated the development of solar rooftop farms to encourage more students to be entrepreneurial; a few schools have already installed solar rooftop panels that feed into their science classes. Spearheaded by youth, other schools have been motivated to replicate this movement. Currently, there are 10 schools already on the list to install solar panels by 2022. Additionally, Kenneth recognized that there was no youth involved in important collaborative meetings, such as UN Asia Pacific Climate Week. With the support of his students, Kenneth decided to reach out to the United Nations Environment Programme (UNEP) and managed to get a speaking slot on the main day of the event for a student speaker, allowing the student to appear on the main stage and present on the importance of youth intervention. Seven other students spoke at related side events, where they discussed and created solutions to combat climate change in China and Hong Kong, and shared ideas on how they are promoting a greener and healthier environment.

Kenneth explains that schools in Hong Kong do not receive enough funding, which can be a barrier to enacting change. Certain schools are impeded by a lack of financing to host field trips, which would provide students with impactful experiences to truly see the SDGs in action. Kenneth advises other teachers and Advocates to “see being a Global Schools Advocate as a lifelong membership to sustainability.” He explains that most Advocates see graduation as an end; but rather, it is the beginning of a lifelong mission in leading, mentoring, and shaping the students of tomorrow.

As Advocates, educators, and Global Schools Mentors, Dhivya Kirupa and Abraham Knight work in a rural area in Tamilnadu, India, with students in grades 8-12. Although they have always engaged in innovative teaching practices, upon receiving the certification to become Global Schools Advocates, Dhivya and Abraham initiated a campaign focused on promoting SDG Target 7.1: “by 2030, ensure universal access to affordable, reliable, and modern energy services”. The aim was to motivate action toward achieving carbon neutrality by 2030 and welcome for-profit organizations to adopt such initiatives in the near future. WCIA (WiseCom Image Academy) used the opportunity of this mass campaign to encourage private companies, specifically Google, to move toward clean energy.

Through the work of Abraham and Dhivya, students from various schools have come forward to thank Google with a strong pledge, each individual student creating a special note. The duo explains that programs on teaching Global Goal 7 were effectively instilled among faculty. Dhivya and Abraham are now working with five schools to run the Zero Carbon Emission Program. Over 2,030 students and 273 faculty members have participated in the Advocates’ activities and signed the campaign materials aimed at raising awareness on SDG 7. This project has allowed both Dhivya and Abraham to take ESD to their community, by working with their district collector and other government-aided schools. As part of their campaign, Dhivya and Abraham conducted workshops and led customized activities in local languages to reach the rural students of Tamil (Tenkasi District), as their district is rich in wind energy production. They included hands-on, skill based sessions and experiments to produce deep insights on the importance of renewable energy. Specifically, the topics emphasized the comparison between current energy sources and renewable energy sources.

Integrating sustainable development into classrooms is an often complex and challenging process. Case studies are fundamental in helping us better understand these challenges at the local level. These two cases detail the experiences of our advocates across many regions and countries and help us understand what common and differentiated challenges each of them has faced and how

these could be addressed in future iterations of the program.

### **Challenges in Implementing SDG 4 in Indian Institutions**

In Indian higher education, progress toward SDG 4, ensuring inclusive and equitable quality education and encouraging opportunities for lifelong learning for all, it is becoming more apparent. ESD competencies allow students to reflect on their own opinions, learn from others and practice empathy, deal with conflicts, develop innovative actions that further sustainability, reflect on their own actions and values, evaluate multiple perspectives and choices, and understand complex relationships and systems.

Universities have improved community involvement, broadened access, and diversified their curricula. Nevertheless, a number of systemic and structural obstacles still stand in the way of achieving SDG 4's goals. As emphasized by the United Nations (2015), achieving quality education requires not only increased participation but also sustained improvements in equity, relevance, and learning outcomes.

### **Quality vs Access**

One of the most pressing challenges is balancing expanded access with the assurance of quality. Through the creation of new universities and the growth of already-existing ones, India has greatly boosted enrolment in higher education during the past few decades. But this quick expansion hasn't always been accompanied by steady advancements in academic standards, facilities, and teaching quality. Variations in institutional capacity, faculty competence, and resource availability lead to disparities in learning outcomes. Consequently, while access has improved, the quality of education remains uneven across regions and institutions.

### **Skill Mismatch**

The "skill mismatch" is the term used to describe the ongoing discrepancy between academic knowledge and industry demands. Many graduates struggle to find employment because they lack the soft, technical, and practical abilities that companies value. Some colleges' traditional curricula are still theory-focused and place little emphasis on industry partnerships, internships, and hands-on learning. The National Education Policy 2020's policies support multidisciplinary and skill-based education, but their successful implementation in all colleges is still developing. In order to match the demands of the labor market with the results of higher education, this gap must be closed.

### **Funding Constraints**

Public spending on education in India is still below international standards, despite the fact that adequate funding is essential for guaranteeing high-quality education. Infrastructure development, hiring faculty, research capability, and technology integration are all impacted by a lack of funding. Budgetary restrictions prevent many public colleges from updating their buildings and implementing cutting-edge teaching strategies. Although the private sector has become more involved, there are still issues with equity and affordability. Therefore, sustained investment is required to ensure inclusive educational progress and enhance institutional capacity.

### **Digital Divide**

Another major obstacle is the digital gap, especially in light of the growing dependence on technology-enabled education. Digital equipment, online learning platforms, and dependable internet connectivity are frequently unavailable to students from rural and marginalized regions. During the COVID-19 epidemic, remote learning revealed significant disparities in digital access, making this gap particularly noticeable. To ensure that technological improvements in education benefit all societal groups, bridging this gap necessitates focused policy interventions, infrastructure development, and digital literacy initiatives.

### **Teacher Training Gaps**

The quality of education is closely linked to the competence and preparedness of teachers. However, insufficient teacher training and professional development opportunities continue to affect learning outcomes in many institutions. Faculty members may lack exposure to modern pedagogical techniques, digital tools, and interdisciplinary teaching approaches. Continuous professional development, capacity-building programs, and institutional support are essential to

equip educators with the skills required for delivering high-quality, student-centered education. Strengthening teacher training mechanisms is therefore a crucial step toward achieving the goals of SDG 4.

### **Strategic Directions for Strengthening SDG 4 Implementation in Indian Institutions**

Achieving the full potential of SDG 4 in Indian higher education requires a forward-looking and systemic approach that addresses existing gaps while leveraging ongoing reforms. Strategic alignment with national policies, technological advancements, and global sustainability frameworks can significantly enhance the effectiveness, inclusivity, and relevance of higher education in India.

### **Strengthening NEP Implementation**

The National Education Policy 2020 must be implemented successfully if higher education is to change. Strong execution mechanisms are crucial, including well-defined deadlines for the implementation of the Choice Based Credit System (CBCS), accreditation changes, and increased institutional autonomy. Promising methods for localized and context-sensitive implementation are shown by state-level initiatives, such as task forces in areas like Karnataka. These initiatives support national goals, including as NITI Aayog's emphasis on reaching a 50% Gross Enrolment Ratio (GER) in higher education by 2035. Ensuring that policy goals result in quantifiable outcomes will need strengthening governance frameworks and accountability systems.

### **Enhancing Industry Collaboration**

Deeper and more organized industry collaboration is needed to close the gap between academic learning and employability. Universities are being urged more and more to form alliances through innovation ecosystems including incubation centers, co-designed curricula, internships, and apprenticeships. These connections can be greatly strengthened by expanding programs run by the All India Council for Technical Education (AICTE). A trend toward practical and application-oriented learning is reflected in the objective of nearly universal student engagement to industry by 2030. These partnerships not only improve students' employability but also encourage creativity, entrepreneurship, and practical problem-solving abilities.

### **Promoting Interdisciplinary Education**

A key component of the NEP 2020 goal is interdisciplinary education, which encourages the fusion of several academic disciplines to tackle difficult global issues. The integration of STEM fields with the humanities, social sciences, and arts is made possible by the growth of multidisciplinary institutions and academic centers. Prominent establishments like the Indian Institutes of Technology (IITs) have implemented hybrid curricula that integrate technical proficiency with viewpoints from management, ethics, and society. The University Grants Commission (UGC) claims that these strategies have shown better employability results and capability for innovation. Promoting multidisciplinary education develops the critical thinking, creativity, and adaptability that are necessary for sustainable growth.

### **Expanding Digital Infrastructure**

In order to guarantee fair access to high-quality education, especially in underprivileged and rural areas, the development of digital infrastructure is essential. The goal of national programs like BharatNet is to enable digital inclusion by offering high-speed internet connectivity throughout villages. Platforms like SWAYAM are developing concurrently to provide scalable, superior online learning options. Institutional preparedness can be greatly improved by investing in digital classrooms, hybrid learning models, and educational tools enabled by artificial intelligence. The Ministry of Electronics and Information Technology (MeitY) has emphasized that boosting learning outcomes and closing the digital divide would depend on achieving widespread digital readiness throughout higher education institutions.

### **Integrating Sustainability Across Disciplines**

Aligning higher education with global development concerns requires integrating sustainability into all academic fields. Universities are encouraged to integrate environmental, social, and economic sustainability into teaching, research, and campus operations through the UNESCO-promoted integration of Education for Sustainable Development (ESD). Additionally,

recommendations supporting green campuses, climate education, and sustainability-focused research have been released by the University Grants Commission. These programs help achieve SDG 13 (climate action) as well as SDG 4 (excellent education). Universities can help students become responsible global citizens who can tackle urgent environmental issues by cultivating sustainability-oriented mindsets and activities.

## CONCLUSION AND FUTURE OUTLOOK

SDG 4 reaffirms the central role of inclusive, equitable, and quality education as a powerful catalyst for socio-economic transformation and sustainable development. At a global level, it emphasizes not only expanding access to education but also enhancing learning outcomes, fostering critical thinking, and equipping learners with competencies required for an interconnected and rapidly evolving world. Despite progress, India continues to face structural challenges in achieving these goals, including disparities in quality, skill mismatch, and limited sustainability integration.

Looking ahead, the future of Indian education lies in adopting a holistic and adaptive approach that combines policy coherence, institutional autonomy, and technological integration. Strengthening industry-academia collaboration, expanding digital ecosystems, and embedding sustainability across disciplines will be crucial. Additionally, fostering global partnerships and aligning with frameworks advocated by organizations such as UNESCO will enhance the global relevance and impact of Indian universities.

A forward-looking education system must also prioritize lifelong learning, innovation, and inclusivity to remain resilient in the face of emerging challenges. By nurturing socially responsible, skilled, and globally competent graduates, Indian universities can significantly contribute to national development and global sustainability goals. Ultimately, the successful realization of SDG 4 in India will depend on sustained commitment, collaborative governance, and a shared vision of education as a transformative force for a more equitable and sustainable future.

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