

A Novel System, Method, and Perspective Plan for the Assessment of Higher Education's Progress Towards the UN Sustainable Development Goals

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Education is considered an integral element of sustainable development, and Sustainable Development Goal (SDG) 4 on quality education is a key enabler for all other SDGs. Therefore, research is primarily focused on the roles and responsibilities of higher education systems, and in the same direction, a novel system, method, and perspective plan in the form of a project is proposed that will facilitate the formation of a global knowledge hub, a data service provider for common people, for researchers, for the Ministry, for each institution, for UN representatives, and for other associated stakeholders. In addition to this, this will exactly reflect the contributions made so far by higher education systems and their' outcomes. This will also reflect how higher education systems are helping to achieve the 17 UN Sustainable Development Goals and their targets by 2030. In the paper, some additional useful information is cited pertaining to UN-SDGs based on the published documents in a sequential and systematic manner, and this will help to understand better the mission, vision, and objectives of UN Sustainable Development Goals, what are the roles and responsibilities of higher education systems in the same context till 2030 onwards with a constant approach, the initiatives that have been taken so far, and the initiatives being undertaken now. Some additional measures and discussions about convergence are also suggested. It is also well discussed about the SDG Index and Dashboards and about some major thrust areas. Since some additional useful information is cited, the source of information for each citation is properly mentioned in the references column.

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Introduction

During the survey and study process of published materials (cited under references) over the net, we have observed that the primary goal of the United Nations on sustainability and development is the survival of humanity. The goals recognize to end poverty as a priority, to build strong economic development and implementation policies, to strengthen the education and health systems, to enforce mechanisms for social protection, to create job opportunities, to consider and implement necessary policies on climate change and environmental protection, to eradicate inequality between gender, caste, race, origin, disability, age, economics, and religions, and to implement policies to eradicate unsustainable consumption patterns, weak institutional capacity, and environmental degradation. However, there are several other important issues to think about, and those issues are mentioned below in the UN-SDG 17 goals and their targets. According to Tang, Q., Leicht, A., and Heiss, J. (2017), for the goals to be reached, everyone needs to do their part: governments, the private sector, civil society, and every human being across the world. Governments are expected to take ownership and establish national frameworks, policies, and measures for the implementation of the 2030 Agenda. Thus, with respect to the SDGs, all countries can be considered developing, and all countries need to take urgent action. However, not all kinds of education support sustainable development. Education that promotes economic growth alone may also lead to an increase in unsustainable consumption patterns. According to UNESCO. (2020), education for sustainable development is recognized as an integral element of Sustainable Development Goal (SDG) 4 on quality education and a key enabler of all other SDGs.

Since the implementation of all other SDGs deeply relies on SDG 4, there should be some mechanisms to regularly assess the contributions and outcomes of SDG 4. However, every country is releasing the dashboard in general for the SDGs.

No such assessment interface was found during the survey phase pertaining to the contributions and outcomes of higher education systems. Therefore, a novel system, method, and perspective plan is proposed in the form of a project in the research article, which is mentioned below at page 7, and the same project can be adopted by any country. However, there are many digital library systems across the world that simply provide community learning resources in general through a single window, such as textbooks, books, articles, audio lectures, video lectures, images, animation, simulation, theses, manuscripts, and many more. But there

is no such mechanism to timely and frequently release updated and summarized statistical information and outcomes country-wise according to the SDGs, which is to be considered an assessment tool to assess progress (an interface) in the form of a data dashboard. The research article includes some citations of the fruitful information based on the published documents, such as the MDGs, Preamble of the UN 17 Sustainable Development Goals, UN 17 Sustainable Development Goals (SDGs), Role of Higher Education in SDGs, Progress in India, and Status of Higher Education. thrust areas, convergent and suggestive measures, initiatives taken, initiatives being undertaken, SDG Index and Dashboards, and finally, a Novel System Proposed, Results and Discussion, Limitation of Study, Acknowledgement, and Conflict of Interest

According to MDG Monitor (2016), initially, the United Nations Millennium Development Goals (MDGs) with eight goals came into effect, which were set by the 189 UN member states in September 2000 and agreed to be achieved by the year 2015. 149 international leaders in attendance committed to combating disease, hunger, poverty, illiteracy, discrimination against women, and environmental degradation. The MDGs were derived from this declaration, and specific indicators and targets were attached to them. There are eight Millennium Development Goals: 1) to eliminate extreme poverty and hunger; 2) to achieve global primary education; 3) to empower women and promote gender equality; 4) to reduce child mortality; 5) to promote maternal health; 6) to fight malaria, HIV/AIDS, and other diseases; 7) to promote environmental sustainability; and 8) to develop a universal partnership for development.

According to the World Health Organization. (2018), Newsroom, Fact Sheets, Detail, and Millennium Development Goals (MDGs) (2018), the MDGs have been superseded by the Sustainable Development Goals (SDGs). According to Rajesh Tandon and Pooja Pandey (2017), the ambitious 2030 Agenda of the United Nations was signed more than three [six] years ago by most member countries. It comprises 17 Sustainable Development Goals, which are universally applicable to all countries in the world. Recent UN reports indicate uneven progress towards achieving these goals in most countries.

According to Tang, Q., Leicht, A., and Heiss, J. (2017), education systems must respond to this pressing need by defining relevant learning objectives and learning contents, introducing pedagogies that empower learners, and urging their institutions to include sustainability principles in their management structures. The UN SDGs cover global challenges that are crucial for the survival of humanity. The goals recognize that ending poverty must go hand-in-hand with strategies that build economic development. They address a range of social needs, including education, health, social protection, and job opportunities, while tackling climate change and environmental protection. The SDGs address key systematic barriers to sustainable development, such as inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation.

Preamble of the UN 17 Sustainable Development Goals

According to the United Nations General Assembly. (2015), this agenda is a plan of action for people, planet, and prosperity. It also seeks to strengthen universal peace through greater freedom. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. All countries and all stakeholders, acting in collaborative partnership, will implement this plan. We are resolved to free the human race from the tyranny of poverty and want to heal and secure our planet. We are determined to take the bold and transformative steps that are urgently needed to shift the world onto a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind. The 17 Sustainable Development Goals and 169 targets that we are announcing today demonstrate the scale and ambition of this new universal agenda. They seek to build on the Millennium Development Goals and complete what they did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: economic, social, and environmental. The goals and targets will stimulate action over the next fifteen years in areas of critical importance for humanity and the planet: 1) People: We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfill their potential in dignity and equality and in a healthy environment. 2) Planet: We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources, and taking urgent action on climate change, so that it can support the needs of the present and future generations. 3) Prosperity: We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and

that economic, social, and technological progress occurs in harmony with nature. 4) Peace: We are determined to foster peaceful, just, and inclusive societies that are free from fear and violence. There can be no sustainable development without peace, and no peace without sustainable development and 5) Partnership: We are determined to mobilize the means required to implement this agenda through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focused in particular on the needs of the poorest and most vulnerable, and with the participation of all countries, all stakeholders, and all people. The interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new agenda is realized. If we realize our ambitions across the full extent of the agenda, the lives of all will be profoundly improved, and our world will be transformed for the better. According to Atasi Mohanty. (2018), it is also recognized that policy instruments or technological solutions are not going to be enough for achieving the SDGs; rather, behavioral change and public awareness are very crucial for sustainable development. According to the United Nations Educational, Scientific, and Cultural Organization. (2018), the 2030 Agenda for Sustainable Development provides a global blueprint for dignity, peace, and prosperity for people and the planet, now and in the future. A few years into the Agenda, we see how civil society, the private sector, and governments are translating this shared vision into national development plans and strategies.

The UN 17 Sustainable Development Goals (SDGs)

According to the United Nations General Assembly. (2015) and Bokova (2017), the following are the 17 UN-SDGs: GOAL 1: No Poverty [End poverty in all its forms everywhere], GOAL 2: Zero Hunger [End hunger, achieve food security and improved nutrition, and promote sustainable agriculture], GOAL 3: Good Health and Well-being [Ensure healthy lives and promote well-being for all at all ages], GOAL 4: Quality Education [Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all], GOAL 5: Gender Equality [Achieve gender equality and empower all women and girls], GOAL 6: Clean Water and Sanitation [Ensure availability and sustainable management of water and sanitation for all], GOAL 7: Affordable and Clean Energy [Ensure access to affordable, reliable, sustainable and clean energy for all], GOAL 8: Decent Work and Economic Growth [Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all], GOAL 9: Industry, Innovation and Infrastructure [Build infrastructure, promote inclusive and sustainable industrialization and foster innovation], GOAL 10: Reduced Inequality [Reduce inequality within and among countries], GOAL 11: Sustainable Cities and Communities [cities and human settlements inclusive, safe, resilient and sustainable], GOAL 12: Responsible Consumption and Production [Ensure sustainable consumption and production patterns], GOAL 13: Climate Action [Take urgent action to combat climate change and its impacts], GOAL 14: Life Below Water [Conserve and sustainably use the oceans, seas and marine resources for sustainable development], GOAL 15: Life on Land [Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests combat desertification, and halt and reverse land degradation and halt biodiversity loss], GOAL 16: Peace and Justice Strong Institutions [Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels] and Goal 17: Partnerships to Achieve the Goal [Strengthen the implementation and revitalize the global partnership for sustainable development].

The 17 sustainable development goals (SDGs) and their Targets

According to the United Nations General Assembly. (2015) and Bokova (2017), we may find that the details of targets for each goal have been fixed.

Role of Higher Education in SDGs and their Targets

According to Coers, N. et. al. (2020), "each of these challenges requires academic knowledge from a range of disciplines and types of analysis." Higher education has an essential role in the achievement of the SDGs and sustainable development more broadly. "Universities and other higher education institutions have a critical role in helping society achieve the Sustainable Development Goals (SDGs) through their research, learning and teaching, campus operations, and leadership." Higher education institutions also play an essential role in disciplinary and interdisciplinary research to generate knowledge to better address diverse, sustainable development challenges. "To increase the likelihood of success for these 17 SDGs, higher education

institutions worldwide must teach and train today's students—tomorrow's decision-makers—to think both critically and ethically, to learn to cope with ethical dilemmas, and to apply systems-thinking approaches to serious and complex societal problems."

According to Tahl Kestin, T. et. al. (2017) and EUA (2018), we must also focus on leadership and external leadership, strengthening public engagement and participation in addressing the SDGs, initiating and facilitating cross-sectoral dialogue and action, ensuring higher education sector representation in national implementation, helping to design SDG-based policies, and demonstrating sector commitment to the SDGs. Please also see the details under the column "What can universities do?" in the same article.

Sustainable Development Goal (SDG) 4 on quality education and a key enabler of all other SDGs

According to I. Bokova (2017), however, not all kinds of education support sustainable development. Education that promotes economic growth alone may well also lead to an increase in unsustainable consumption patterns. The now well-established approach of Education for Sustainable Development (ESD) empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability, and a just society for present and future generations. ESD aims at developing competencies that empower individuals to reflect on their own actions, taking into account their current and future social, cultural, economic, and environmental impacts from a local and global perspective. Individuals should also be empowered to act in complex situations in a sustainable manner, which may require them to strike out in new directions and to participate in socio-political processes, moving their societies towards sustainable development. ESD has to be understood as an integral part of quality education, inherent in the concept of lifelong learning. All educational institutions, from preschool to tertiary education and in non-formal and informal education, can and should consider it their responsibility to deal intensively with matters of sustainable development and to foster the development of sustainability competencies. ESD provides an education that matters and is truly relevant to every learner in light of today's challenges. ESD is holistic and transformational education that addresses learning content and outcomes, pedagogy, and the learning environment. Thus, ESD does not only integrate contents such as climate change, poverty, and sustainable consumption into the curriculum; it also creates interactive, learner-centered teaching and learning settings. What ESD requires is a shift from teaching to learning. It asks for an action-oriented, transformative pedagogy that supports self-directed learning, participation and collaboration, problem-orientation, inter- and transdisciplinarity, and the linking of formal and informal learning. Only such pedagogical approaches make possible the development of the key competencies needed for promoting sustainable development. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development.

Thrust Areas, Status of Higher Education Institutions, Initiatives Taken, Suggestive Measures & Convergence, SDG Index & Dashboards in perspective of India and under the purview of SDGs.

In this column, some discussions have been made about the strength and dimension of higher education in India. Thrust areas that are to be given first priority, initiatives that have already been taken from the perspective of UN-SDGs, initiatives that are being undertaken, suggestive measures, what the scopes of convergence are, and the SDG Index and Dashboards have been discussed.

Thrust Areas

According to Rajesh Tandon, Pooja Pandey (2017), and Batra. P. et. al. (2021), India is one of the critical countries where the achievement of the SDGs will be essential for realizing the 2030 Agenda in the forthcoming years. India has a population of 1.36 billion people, of which two-thirds are located in 650 thousand villages, others in 8,000 urban centers, and in over 75 megacities and metros. One-third of the world's poor are in India (SDG 1: No Poverty); regular media reports indicate continued hunger amongst some indigenous and caste communities. (SDG 2: Zero Hunger); child malnutrition indicators in India are worse than in several low-income countries (SDG 3: Health & Well-being); entrenched patriarchy restricts education for girls after puberty (SDG 5: Gender Equality); access to safe water is decreasing (SDG 6: Clean Water & Sanitation); and several Indian cities have the worst air pollution levels in the world (SDG 11: Sustainable Cities & Communities). Much needs to be done in India for systemic progress on the SDGs before 2030.

According to Karan Karayi (2019), with India representing one-seventh of the world's population, the world cannot achieve its Sustainable Development Goals (SDGs) without India's support. Thus, an ambitious 10-year plan commencing in 2020 focuses on helping India accelerate progress towards achieving its SDG targets by 2030.

Status of Higher Education Institutions

According to Rajesh Tandon, Pooja Pandey (2017), and Batra. P., et. al. (2021), India's higher education sector is the third largest in the world. There are 903 (updated numbers as per AISHE 2019-20: 1043) universities, more than 10,000 professional technical institutes (updated numbers as per AISHE 2019-20: 11779), and 42,000 colleges (updated numbers as per AISHE 2019-20: 39955) in both the public and private sectors. Including technical and professional institutions, about 36.6 million students were enrolled in these postsecondary educational institutions as per the All India Survey of Higher Education Data (2017–18) and the updated numbers as per AISHE 2019–20: 38.53 Undergraduate level across India Moreover, these numbers are rapidly increasing. Despite being such a large sector, conversations about the integration of the SDGs into the operations of higher education institutes (HEIs) are still rather weak.

Initiatives taken

According to Rajesh Tandon and Pooja Pandey (2017), at the policy level in India, much of the attention to the SDGs is being led by the national government through NITI Aayog, which has created a national framework. The Ministry of Statistics and Programme Implementation (MoSPI) is assisting NITI Aayog in interacting with other ministries and developing indicators reflecting the SDG goals and targets. However, educational institutions have remained somewhat disconnected from the SDGs.

According to NITI Aayog, Sustainable Goals, Line Ministries, as per the Niti Aayog, as SDGs cover almost every area of development, all Line Ministries are direct or indirect partners in the SDG efforts. However, the Vertical has developed close associations with the Ministry of Statistics and Programme Implementation, the Ministry of Development of the North Eastern Region, the Ministry of Finance, the Ministry of Education, the Ministry of Health and Family Welfare, and the Ministry of Women and Child Development.

According to Krishna, J., and Noda, S. (2021), the premier policy 'Think Tank' of the Government of India developed an SDG India Index in 2019 to provide a holistic view on the social, economic, and environmental status of the country and its states and UTs. The index was designed to provide an assessment of the performance of all Indian States and UTs and to help leaders and changemakers evaluate their performance against the SDGs and identify priority areas where urgent action is needed. According to Krishna, J., Noda, S. (2021), and NITI Aayog. (2021), a table of the performance of states and UTs on indicators of SDG 4 is mentioned.

According to NITI Aayog. (2021), the Index for Sustainable Development Goals (SDGs) evaluates the progress of states and Union Territories (UTs) on various parameters, including health, education, gender, economic growth, institutions, climate change, and environment. The index was developed in collaboration with the United Nations in India. It tracks the progress of all states and UTs on 115 indicators aligned with the National Indicator Framework (NIF) of the Ministry of Statistics and Programme Implementation.

Suggestive Measures and Convergence to be Taken or Being Taken (Bridging the Gap in Teaching and Research on SDGs in HEIs in India)

According to Rajesh Tandon and Pooja Pandey (2017), despite being such a large sector, conversations about the integration of the SDGs in the operations of higher education institutes (HEIs) are still rather weak, and national associations of higher education have not taken up the matter either. The Association of Indian Universities (AIU) is the oldest such network, mostly including public institutions. The Federation of Indian Chambers of Commerce and Industry (FICCI) Higher Education Committee has been bringing together private institutions for the past two decades. Neither has inspired their members to focus on the SDGs as a core function of HEIs. Not even NITI Aayog's national approach to achieving the SDGs in India contains any mention of HEIs or their possible contributions.¹⁰ Perhaps in parallel to this, the University Grants Commission (UGC), the senior policy-making body on higher education in India, has just announced a new policy framework, Fostering Social Responsibility and Community Engagement in Higher Education

Institutions in India (2019). These new guidelines recommend that “the goals of fostering social responsibility and community engagement in *HEIs*” can comprise: improving the quality of teaching and learning in HEIs by bridging the gap between theory and practice through community engagement; promoting deeper interactions between higher educational institutions and local communities for the identification and solution of real-life problems faced by the communities in a spirit of mutual benefit; facilitating partnerships between local communities and institutions of higher education so that students and teachers can learn from local knowledge and wisdom; Engaging higher institutions with local communities in order to make curriculum, courses, and pedagogies more appropriate to achieving the goals of national development; Catalyzing the acquisition of values of public service and active citizenship amongst students and youth alike, which would also encourage, nurture, and harness the natural idealism of youth; undertaking research projects in partnership with local communities through community-based research methods. Further, the above guidelines recommend that existing courses be redesigned to integrate interactions with local society into the learning process. Additionally, these guidelines propose that new courses that are relevant to changing societal contexts should be offered as options to all students. “Such courses can be audited by students or taken as a part of the 25% provision for external (to faculty) courses now allowed by UGC guidelines. These can be short-term certificate courses or integrated into the existing syllabus. By their very nature, such courses are trans-disciplinary and require community engagement activities by students. Additionally, new courses that teach about Sustainable Development Goals (SDGs) will provide local understanding about some of these goals to students, in addition to learning about Agenda 2030.¹³”. Therefore, discussions about integrating the SDGs within HEIs, their professional associations, and networks in India will hopefully gather some momentum soon.

SDG Index & Dashboards

According to Sachs, J. D. et. al. (2021), the Sustainable Development Report (formerly the SDG Index and Dashboards) is a global assessment of countries' progress towards achieving the Sustainable Development Goals. It is a complement to the official SDG indicators and the voluntary national reviews. The 2021 SDG Index: from the Download Report and Materials: The SDG Index is an assessment of each country's overall performance on the 17 SDGs, giving equal weight to each goal. The score signifies a country's position between the worst possible outcome (0) and the best, or target outcome (100). For example, Finland's overall index score (85.9) suggests it is, on average, 86 percent of the way to the best possible outcome across the 17 goals.

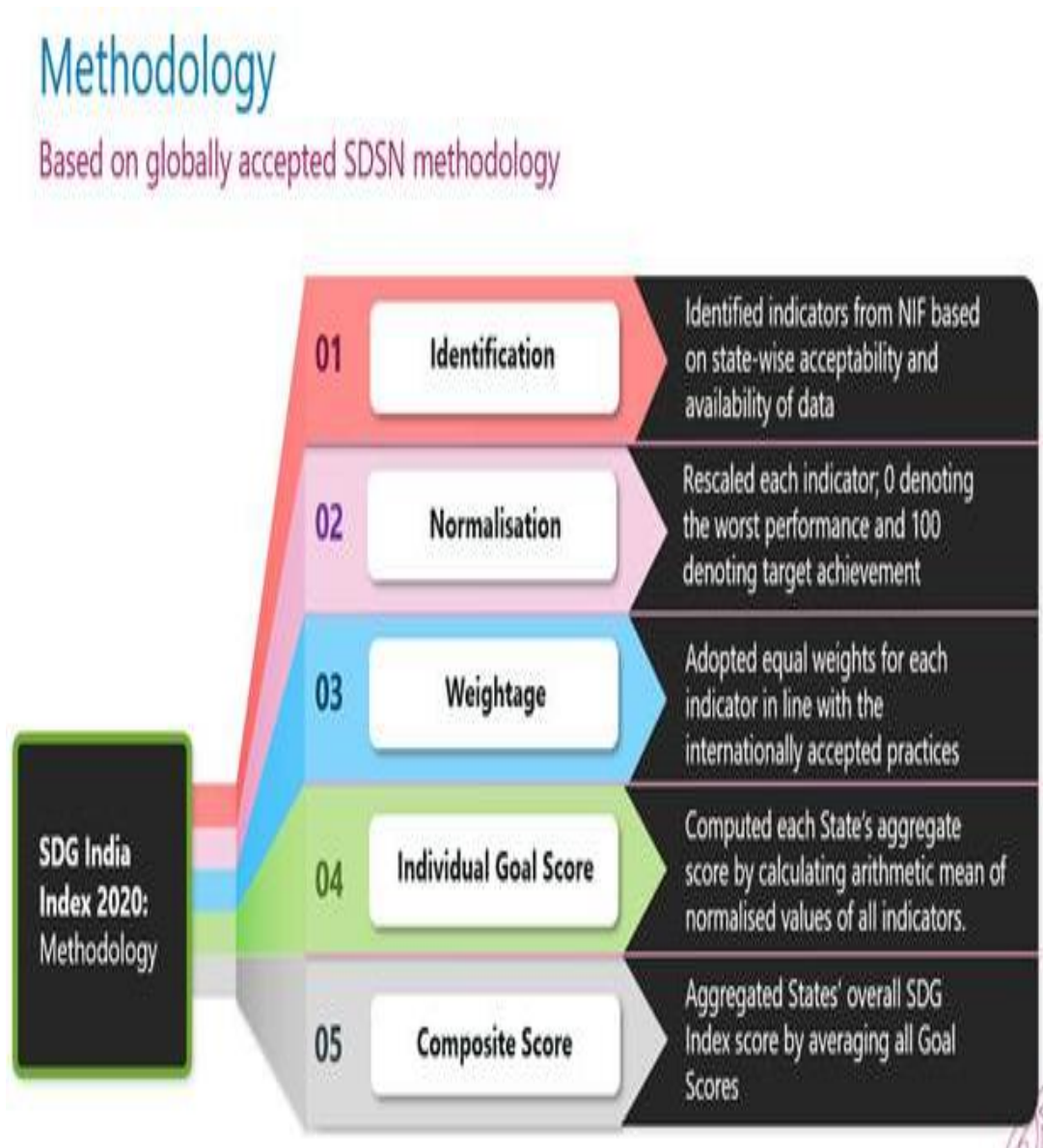
According to Guillaume Lafortune, et. al. (2018), the SDG Index and Dashboards Report benchmarks the performance of countries on the Sustainable Development Goals (SDGs) adopted in September 2015 by the global community. Official indicators are not sufficient to monitor comprehensively the implementation of the SDGs, and non-official data sources can help bridge this gap. Non-official data sources include data produced by research institutions, universities, civil society, and other partners.

According to NITI Aayog. (2021), as per the NITI Aayog, from covering 13 goals with 62 indicators in its first edition in 2018, the third edition covers 16 goals with 115 quantitative indicators, with a qualitative assessment on Goal 17, thereby reflecting our continuous efforts towards refining this important tool,” said Ms. Sanyukta Samaddar, Adviser (SDGs), NITI Aayog.

According to NITI Aayog (2020), the SDG India Index in 2020 as per Niti Aayog is 66, and according to Sustainable Development Report 2021, which includes the SDG Index and Dashboards: The Decade of Action for the Sustainable Development Goals, India is at 60.1. According to NITI Aayog (2020), there are four categories based on the SDG Index score: aspirant: 0–49; performer: 50–64; frontrunner: 65–99; achiever: 100. According to NITI Aayog (2021), the National Institution for Transforming India (NITI), as per NITI Aayog, the SDG Index Score for Goal 4 ranges between 29 and 80 for states and between 49 and 79 for UTs. According to NITI Aayog. (2021), overall, currently, there are no states in the aspirant and achiever categories; 15 states/UTs are in the performer category, and 22 states/UTs are in the front-runner category. According to the Sustainable Development Report, The SDG Index and Dashboards, Part 2, the SDG dashboards highlight each country's strengths and weaknesses in relation to the 17 goals, presenting performance in terms of levels and trends.

SDG Index Methodology and Overall Results and Findings

According to NITI Aayog. (2021), the country's overall SDG score improved by 6 points—from 60 in 2019 to 66 in 2020–21. This positive stride towards achieving the targets is largely driven by exemplary country-wide performance in Goal 6 (Clean Water and Sanitation) and Goal 7 (Affordable and Clean Energy), where the composite Goal scores are 83 and 92, respectively. The SDG India Index 2020: Methodology is also given below:



SDG India Index 2020: Methodology

A Novel System, Method, and Perspective Plan Proposed in the Form of a Project

Before mentioning a novel system proposed in the form of a project in this research article, according to Agne, K., et. al. (2020), please see the quote of Kumsal Bayazit, CEO, Elsevier, 2020. "It is our goal to do everything we can to ensure that our unique strengths in content, data, and analytics help researchers and health professionals make the targets set by the United Nations in 2015 a reality." The Power of Research to Advance the SDGs: Mapping research data to address existing gaps and further progress towards the 2030 Sustainable Development Goals. In 2015, the United Nations Sustainable Development Goals (SDGs) set an ambitious 2030 target to achieve a sustainable and equitable future for our planet. 2020 marks five years since then, and for the remaining ten years, we have to achieve them since 2020. Research provided by the global research community forms the essential basis for society to make the gains in life expectancy, poverty reduction, and global health that we have seen in the last century. Research leads the way to change. Our latest

report, *The Power of Data to Advance the SDGs*, shows that over the last five years, SDG-related publications have reached a staggering 4.1 million articles.

A novel system, method, and perspective plan is proposed; this is a kind of assessment tool for higher education's progress towards the UN Sustainable Development Goals. This is similar to conducting mapping of publication production and bibliometrics, mapping of human resource data, and also other useful publication production, which is from the perspective of the SDGs. The system is a narrowed version of big data digitization from the perspective of the SDGs. The development of systems will generate unique opportunities to strategically address challenges associated with the United Nations Sustainable Development Goals (SDGs) to ensure an equitable, environmentally sustainable society, free of poverty, hunger, child labor, economic growth, decent work, consumption and production, quality education, and finally, peace and a healthy society with interconnectivity, interoperability, and networking.

The system is designed in the same direction up to a certain level to measure the volume of work and contributions done by higher education systems in any country so far. We can also say that this is a kind of initiative pertaining to "assessments of higher education's progress towards the UN Sustainable Development Goals." The system will definitely be a fruitful initiative from the perspective of UN-SDGs, with features of data analytics and frequent releases of updated data dashboards. It will also be a source of data service for all concerned.

The system has mainly identified three types of users: 1) contributors (each private and government-funded higher education institution); 2) beneficiaries (audience) or stakeholders: urban and rural people, researchers, ministerial-level associates, institutional-level associates, and UN-level associates; and 3) people who will look after the activities of recruitment, procurement, meetings, development, testing, deployment, and maintenance of the system, analyzing informational resources acquired, and placing them with the above-mentioned beneficiaries and stakeholders.

A core group of the project will invite a nodal person, considering themselves a contributor from each higher education institution, either government or privately funded, across the country. The core group will invite them to register their institutions on the system and to create a login credential. Each registration will finally be authenticated and approved by the core group.

Now the system will allow each contributor (a nodal person and their associates) to store short summary outcomes based on academic and research knowledge-based information resources, innovative stuff, best practices, framework and policy documents, and case studies carried out in association with the SDGs, and they will attach hyperlinks to each document if the document is already published elsewhere and will map each document with the appropriate UN SD goal and target (this will enable us to track and better understand which goals received the most and least attention in the institution and country as a whole). Each record will also have some additional fields to capture outcome-based digital information (numbers). Each contributor will also store human resource data (such as people engaged in jobs for implementing the SDGs, people empowered through academic or vocational training, and young people who are mobilized in an area of SDGs and inclusive network partners) and their engagements in the appropriate SD goals and targets. The system will also have a provision to allow each contributor to upload academic and research knowledge-based information resources, innovative stuff, best practices, frameworks, and policy documents, as well as the case studies carried out associated with the SDGs, in the form of multimedia formats if that information is not yet published elsewhere.

Once the system takes considerable shape, the data analytics process will start to assess the contributions and outcomes of the 17 SDGs and their targets made so far through higher education systems. The system will attempt to store information (institutional, goal, and target-wise). Initially, the system has been proposed or identified to capture information in the following categories: SDG Framework and Policy, Case Study, Thesis, and Dissertation Innovative and outcome-based students Project Report, Conference Proceedings, Journals, Books, Chapters, Books, Monographs, Editorials, Patents, and Copyrights (just outcomes and commercial values), best practices adopted, Innovative ideas (outcomes of the ongoing and completed sponsored research and consulting projects), courses and lectures (including audio and video), Social Impact-Driven Projects, SDG-based various academic and research programs, Pedagogy (how sustainable development is being taught, researched, and promoted by universities, colleges, and institutions), Teachers Capacity building from the perspective of the SDGs, Providing opportunities for youth engagement,



Empowering and mobilizing local people, Institute graduates engagement in SDGs, Inclusive network partners

Then the metrics and numbers (in the context of real-world sustainability impact) on the dashboard will be provided at the institutional and ministerial levels, as well as for the UN representatives, the urban and rural people of the country, and finally for the researchers (visualizing and interpreting the results). The updated version of the data on the dashboard will be released on a quarterly or half-yearly basis every year. Other stakeholders (faculty, students, researchers, innovators, entrepreneurs, institutions, employers, industries, research laboratories, and common urban and rural people) will also receive regular benefits from the system.

Based on the outcomes and data analytics, the system will have a provision to suggest some strategies and planning pertaining to improvement in the existing teaching, learning, and pedagogy practices and employability in case of a shortfall observed institution-wise as well as country-wide in the higher education systems as evidence to further strengthen the real-world sustainability impact. The system will also have provisions for further encouraging teaching sustainable development across all disciplines, research and dissemination of sustainable development knowledge, green campuses, etc.

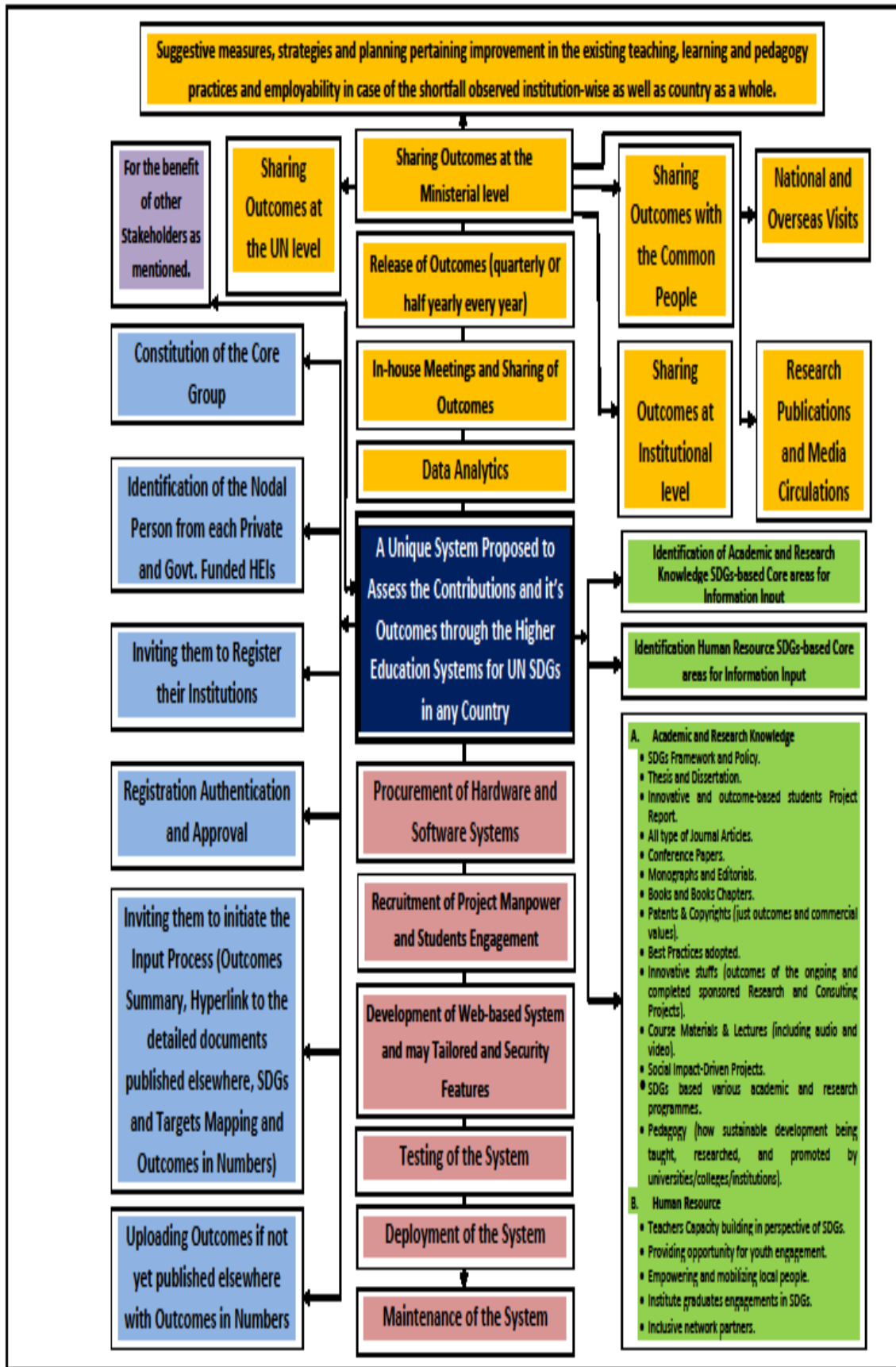
The said project will definitely serve as a potential project for all faculty, students, researchers, innovators, entrepreneurs, institutions, employers, industries, research laboratories, common urban and rural people in terms of learning, adopting best practices, seeking help in their research from inter-linked exploration from multidimensional information resources, and finally for the UN representatives in terms of the 17th UN SDGs and at the Ministerial and Institutional level in terms of progress of higher education systems in the area of UN-SDGs. This system will have an integrated set of services for capturing, cataloging, storing, searching, protecting, and providing convenient access. The system will also build a bridge between science-society, engineering-society, and science-engineering. The system will be considered innovative in the sense of product innovation, process innovation, audience innovation, and technology innovation. The system will cover the following academic domains: social science, earth and agriculture sciences, computer science, natural sciences, biomedical science, medicine and medical sciences, law, architecture and regional planning, business management, and other socially relevant engineering, science, and social sciences. The system will also have many security and authenticity features. The system will also have many tailored-based features. The system will be considered an on-going process of evolving knowledge and information resources and will not stop at any one point. But to evolve the information resource into a considerable shape, a minimum of three years will be required. This will include procurement, recruitment, development, testing, deployment, and the uploading of knowledge-based information resources and human resource data to their highest extent. In the first year, normally, a process of procurement, recruitment, development, testing, and deployment will begin. In the second year, the system will invite contributors (from all institutions across the country) to register themselves. The creation of login credentials will begin for the institutions, and upon validation, the system will allow each contributor across the institutions to initiate the uploading of knowledge-based information resources and human resource data. Finally, in the 3rd year onwards, the system will begin the data analytics process, and simultaneously, the system will also allow each contributor to continue the data uploading process.

The project will have a provision to involve some students to work within the system throughout the project life cycle. Based on the research and outcomes pertaining to this project, there will be initiatives to publish some research papers in journals, newspapers, or other public sources. The system will provide a unique interface between institutions and policymakers, for the Ministry, UN representatives, the common people, and researchers.

The project will definitely be scalable and very applicable.

A framework for a novel system, method, and perspective plan is proposed. (A set of activities in different colors categorizing the system boundary at the 1st phase and on later may further be expanded.)





Project Budget Cost (Based on INR and for India period for 36 months)

Approx. 2 crores, including manpower, software and hardware requirements, other accessory contingencies, travel costs, and consumables.

Manpower Requirements Suggested

Following manpower requirements have been suggested: head of the project, associate heads, system and application manager (one), experienced back-end developer (one), experienced front-end developer (two), supporting staff (two), and one to two student(s) participation always throughout the project.

Software and Hardware Requirements and Specifications

The following hardware requirements have been suggested: High Configuration and Data Storage Server: two; High Configuration Desktop PC: three; 3-in-1 Laser Jet Printer: two; High Configuration Laptop: one; UPS 30 KVA: one; Online StorageWork: two; other accessories OS: Linux and LAMP Stack Open Source

Results and discussion

Education is considered an integral element of sustainable development, and Sustainable Development Goal (SDG) 4 on quality education is a key enabler for all other SDGs. The roles and responsibilities of the higher education system are vital now. All higher educational institutions must consider their roles and responsibilities to deal intensively with sustainable development issues, foster the development of sustainability competencies, and develop specific learning outcomes. Therefore, it is vital not only to include SDG-related contents in the curricula but also to use action-oriented transformative pedagogy, teacher capacity building from the perspective of SDGs, human resource engagements (providing an opportunity for youth engagements, empowering and mobilizing local people, institute graduate engagements in SDGs, carrying out research and innovation, and socially driven-impact projects, best practices, case studies, new courses and academic program offerings, formulation of new policy documents, and also to build inclusive network partners). Therefore, educational officials, policymakers, educators, curriculum developers, and others are also called upon to rethink education in order to contribute to the achievement of the SDGs. Keeping in mind this, a novel system, method, and perspective plan is proposed in the form of a project in this paper, and this is a really fruitful initiative to regularly assess contributions and outcomes through higher education systems in any country. The system will also do some regular data analytics and will prepare, release, and share quarterly or half-yearly data on the dashboard with different stakeholders, as has been mentioned above, as much as possible, based on the ongoing process of information being captured, and the system will finally become a knowledge hub and a data service provider for different stakeholders.

Limitations of the Study

We will think further about areas that have been left behind and incorporate them into the system. This will depend on the time we consume to accomplish this task. Once considerable information resources have been made during the regular data analytics process, some new ideas will also immerse themselves and will definitely be translated into additional features within the system, which will also populate additional statistics.

Acknowledgement and Conflict of Interest

There is no conflict of interest. The research article is written on the subject area of UN-SDGs and how higher education systems are making contributions to them. In this research article, a novel system, along with a method and perspective plan in the form of a project, is proposed to regularly assess the contributions of education systems in any country in the context of the UN SDGs. Besides, whatever information is mentioned in the article is properly cited in the references below. There is no funding for this article.

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