SOUVENIR

&

ABSTRACTS VOLUME

MOBIUS FOUNDATION

The Climate Reality Project
INDIA

UNESCO
United Nations Educational, Scientific and Cultural Organization

In partnership with
New Delhi Office
Cluster Office for Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka

www.icse2019.org

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INTRODUCTION

Humans have been using education as a tool for social change since time immemorial. In the present scenario, owing to growing environmental challenges, we need to change our ideas and attitudes towards planet earth which can be made possible only through education. Humans are the creators of most of the environmental problems and can be resolved by them only, in which education plays a key role. Over the years, the environment has been rapidly deteriorated in its quality which has majorly been caused due to air, water and land pollution, loss of ecosystems and species etc. Climate change is one of today's most serious global challenges to sustainable development and requires immediate and urgent actions to address its damaging impacts.

Although, various efforts have been taken globally in this direction, still the potential of education has not been fully utilized by educators as well as policy and decision makers, to address these challenges. Over the years, Environment Education has come up as a distinct discipline and variety of approaches and methodologies of teaching and learning have evolved at distinct levels. However, there is a need to bring out specifics and intricacies of environment education as an agent of change and transformation in true sense. Also, more knowledge must be spread about how individuals impact their climate and the environment that they live in. Practical examples of this must be embedded in the education system and also in day today life across the globe. It is also interesting to witness how humans have changed their approach from Environment Education (EE) to Education for Sustainable Development (ESD) and moving towards more focused approach i.e. Climate Change Education (CCE) which reflects the urgent need for reorienting educational priorities to the newer and complex global challenges of today.

The proposed International conference on "Sustainability Education" is planned to bring together experts and practitioners of EE, ESD and CCE together on a single platform to discuss innovative ideas, practices and policies. Therefore we aim to bring forward the action agenda for sustainability education with main focus on primary school education in order to transform young minds, as they are on the threshold of becoming active leaders for tomorrow. The conference deliberations will highlight the key role of ESD, as an important element of quality education. The conference revolves around Target 4.7 on ESD and related approaches.

MESSAGES

Education is key to the global integrated framework of sustainable development goals. Education is at the heart of our efforts both to adapt to change and to transform the world within which we live. It is recognized as having one of the highest long-term returns on investment of all development goals. There is a need to rethink and broaden the notion of lifelong education. It should enable people to develop an awareness of themselves and their environment.

ICSE 2019 has been organized with its ultimate goal of developing societies competent in the principles of sustainability and striving to live within the carrying capacity of the planet. ICSE 2019 aims to aid implementation of education for sustainable development (ESD) which is culturally-relevant, locally appropriate, occurring across national school education system.

Mr. Pradip Burman

Founder & Chairman

Mobius Foundation

MOBIUS FOUNDATION

On behalf of the organizing committee, partners and supporters, it is my pleasure to welcome you to the First International Conference on Sustainability Education being organized on 9-10 September 2019 in New Delhi. The idea to organize this Conference came from the felt need of reorienting education towards sustainability issues in the context of the global commitment for Agenda 2030 and Sustainable Development Goals. ICSE 2019 is being planned as a major International event aimed at bringing together experts, practitioners and policy makers on one platform to discuss innovative ideas, practices and policies related to sustainability education with focus on school education.

We are working towards making ICSE 2019 as one of the most exciting and stimulating experience for the participants by including plenaries, technical sessions, keynote speeches, case studies presentations, experience sharing sessions, thematic side events, posters and exhibitions covering diverse elements of sustainability education including environment education (EE), Education for Sustainable Development (ESD), climate change education (CCE) etc. The conference will provide the participants ample opportunities for interactions, discussion and networking with leaders in the field. We invite you to contribute your ideas and proposals about the format and content of the conference as well as action agenda for inclusion of sustainability issues in the school education system.

Dr. Ram Boojh

Convener, ICSE 2019

Director Programmes, Mobius Foundation

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Climate Change and our unsustainable lifestyles are a threat to future generations. How we deal with this effectively will be defined by how well the current and future generations are educated on solutions and handling of the crises.

Mr. Aditya Pundir

Country Manager,

The Climate Reality Project Foundation

United Nations Educational, Scientific and Cultural Organization

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No one should be left behind. That is the core message of the 2030 Agenda for Sustainable Development. The Agenda recognizes the importance of education as a driver of human development, with Goal 4 of the Sustainable Development Goals (SDGs) emphasizing that we must 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'.

Target 4.7 of the SDGs notes that learners must acquire the skills needed to promote sustainable development through forms of education that focus on sustainable lifestyles, human rights, gender equality, the promotion of a culture of peace, global citizenship and the appreciation of cultural diversity. We are proud that UNESCO's leadership in the field of education has placed us at the forefront of global efforts to achieve SDG 4.

UNESCO is delighted to partner with the Mobius Foundation to co-organize an International Conference on Sustainability Education in New Delhi on 9–10 September 2019. We believe that the conference will be instrumental in building momentum and interest for the uptake of sustainability education, and will help a new generation make sustainable development a reality.

Mr. Eric Falt

Director and UNESCO Representative

CEE
Centre for Environment Education

"The involvement of citizens is critical as we move towards a sustainable society and a circular economy. India is one of the only countries in the world that has recognised this and made Environmental Education compulsory at all levels of formal education. Quality Environmental Education is essential. The ICSE conference brings together some of the best organisations from across the globe to share practices leading to excellence in education."

Kartikeya Sarabhai

Founder and Director, Centre for Environment Education (CEE)

THE ENERGY AND RESOURCES INSTITUTE
Creating Innovative Solutions for a Sustainable Future

I am delighted that TERI is partnering with the Mobius Foundation to jointly organize the 2019 edition of the International Conference on Sustainability Education (ICSE), to be held at the India Habitat Centre, New Delhi on 9th & 10th September, 2019.

This conference will provide an opportunity for the sharing of global best practices and experiences in sustainability education, and in stimulating thinking on ways and approaches to achieve Target 4.7 of the Sustainable Development Goals amongst each participant and each participating organisation. It will, I hope, consequently also stimulate the development of new partnerships which enable new ways and approaches to be set and met.

Dr. Ajay Mathur

Director General, TERI

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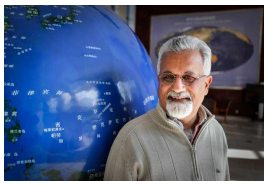
ECOS

As greenhouse gas concentrations continue to rise and mass extinctions continue unabated, the future of humanity to be able to thrive and for civilization as we know it to survive hangs in the balance. Three strategies to address these challenges—Environmental Education, Education for Sustainable Development and Climate Education-- potentially overlap synergistically, but in practice they are often marginalized and forced to compete for limited coverage in the curriculum. Traditional Environmental Education encourages outdoor, direct experience with the natural world, with a focus on protecting the environment through recycling and reducing plastic waste, but may be light on science literacy. Education for Sustainable Development tends to be framed in the context of United Nations initiatives, such as the Sustainable Development Goals, which teachers and students in many parts of the world are completely unaware of. And Climate Education, which has developed primarily in the past decade, usually focuses on the scientific causes and effects of climate change, with some passing acknowledgement of strategies, such as renewable energy, to reduce human impacts on the climate system. While awareness of climate and other global changes caused by human activities may be growing in some circles, none of these approaches have been able to achieve the societal transformation and action necessary to avoid continued mass extinctions or been able to reduce greenhouse gas concentrations. Add to the mix the evidence that education itself is linked to higher resource use, resulting in larger planetary impacts. In other words, the more educated a person is, the more impact on the environment they tend to have because of their more energy and resource intensive lifestyles. So if education itself is part of the problem and these important, well-intended but limited and marginalized educational domains have yet to transform society or substantially reduce planetary risks, what is the solution? An integrating, interdisciplinary pedagogy that combines the best of these three domains-- the direct experience of Environmental Education, the global perspective of Education for Sustainable Development, the science and solutions of Climate Education—and merges them with traditional reading, writing and social studies could enhance the potential for humanity to survive and thrive in the coming decades and centuries. But such a transformation will require a pedagogical revolution that will demonstrate in every community of the planet what low-impact, high quality lifestyles and career pathways look like. This can be accomplished by delivering a toolkit of appropriate technologies, such as solar panels and fuel cells, with teaching resources that can be customized for local language, customs and context. Education has been massively transformative in the past and it must be for the future, but this requires recognizing the nature and depth of the challenge, accepting the truth of the situation, and responding accordingly.

Mark S. McCaffrey

Co-Focal Point for ECOS



The 2030 UN agenda for attaining sustainable development goals is a critical period of experimentation and learning for sustainability education. Education, formal and non-formal must seek out and encourage all types of learners to engage in real-life situations where individuals and communities consider environmental, social and economic trajectories of change and make trade-offs and judgments that benefit their own as well as planetary wellbeing. Sustainability education must avoid the pitfalls of "all theory and no practice"; sustainability educational curricula that emphasize learning are a critical need in both formal and non-formal education sectors.

Dr. Natarajan Ishwaran

Editor in Chief, Environmental Development (Elsevier)

Education is the benchmark for everything which is sustainable. Our ability to build skills and knowledge for the unique challenges faced on earth today; such as adaptation to climate change, water scarcity, increasing prevalence of natural disasters and a changing global economy; can only be achieved through sustainable and participatory education. In the English language, the same letters which spell “EARTH” spell “HEART’, learning to live in harmony with one another will come from understanding of ourselves and one another. Working with compassion, fear melts away into flow, enabling us to change behavior at local level through both formal and informal education from the earliest age, will lead to a world of peace and abundance of resources. It is my hope that the ICSE will lead the way to sustainability and preparedness.

Donna L. Goodman

Founder and Executive Director of the Earth Child Institute (ECI)

The International Conference on Sustainability Education is aptly placed as 2020 will see five years of the Sustainable Development Goals. The conference would help set the ball rolling to reflect on Education for Sustainable Development Goals (ESDG), especially in the context of Target 4.7. With 2019, The Eco-Schools programme is entering into its 25th year of engaging young people in taking positive actions that transform them for life. Eco-Schools is a programme that has developed from a European educational programme to a global model for Environmental Education and Education for Sustainable Development. Over the years the programme has grown to have an outreach of more than 52000 schools in 68 countries that engage 19 million students who are supported by 1.4 million teachers. The programme aims at providing every child with the opportunity to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future by integrating priority sustainable development issues into teaching and learning.

The Young Reporters for Environment (YRE) programme aims to empower young people with skills to take a stand on environmental issues they feel strongly about and to give them a platform to articulate these issues through the media of writing, photography or video. The programme is active in 34 countries worldwide. The YRE programme brings students of all backgrounds together with a sense of common purpose and helps develop the skills of communication, taking initiative, teamwork, critical analysis, social responsibility and leadership. We will see some YRE students participating in the conference and reporting the proceedings and outcomes. The third education programme of FEE; Learning About Forests (LEAF), gives students learn to enjoy the outdoors, experience and observe nature. The positive outdoors experiences develop a positive attitude toward the environment and our forests. The programme is operational in 26 countries.

We look forward to sharing best practices from the programmes and contribute to supporting the efforts in ESDG.

Dr. Pramod Sharma

Senior Director of Education, Foundation for Environmental Education (FEE)

HM Government of Gibraltar

Sustainable Development cannot be attained without education. Few would dispute that the number of learners accessing education has increased significantly over the last few decades and yet we are experiencing the highest levels of unsustainable development. Many educators share my concern that, currently, education is not fit for purpose. We need education to be transformative and education systems to be transformed. This Conference provides an opportunity to rethink education and redefine learning. It will help develop partnerships, pathways and inspiration needed to attain SDG 4 and move us closer to a fairer and more sustainable world.

Prof Daniella Tilbury

Commissioner for Sustainable Development

If education has to be ‘future-ready’ then it is imperative that it is ‘SDGs-ready’. The time for teaching the 'best practices’ would soon be part of history because the future is for ‘next-practices’. In the world of accelerated change where the technologies are characterised by quantum-jumps, learning ABCD means acquiring Artificial Intelligence, Block chain, Cloud-networking and Digital data transformation. That's precisely why we need ‘next-practices’ for the GenNext. These next practices will leverage the modern technologies to educate the future policy makers and contribute to the Sustainable Development Goals.

I am sure ICSE 2019 would promote deployment of such educational practices to mould the minds and incubate the dreams of the youth in this very direction

Mr. Rajendra Shende

Chairman of TERRE Policy Centre

The Foundation for Environmental Education is happy to partner with the International Conference on Sustainability Education. FEE, represent 98 members across 76 countries and is recognised by UNESCO as a world leader within the fields of Environmental Education (EE) and Education for Sustainable Development (ESD). FEE's strength comes from its members who share the conviction for a sustainable world and execute the five ESD programmes with great efficiency. FEE helps communities realise the benefits of sustainable living through the solution and positive action based approaches. FEE believes in the power of change through its programmes that are creating a cadre of educated and environmentally conscious people equipped to lead a sustainable life. The three youth-focused educational programmes, Eco-Schools, Learning about Forests (LEAF) and Young Reporters for the Environment (YRE), use a solution based pedagogical approach to empower young people to create a more environmentally conscious world based on feelings of involvement, ownership and protection. The Green Key and Blue Flag initiatives are recognised across the world for their promotion of sustainable resource management and business practices.

FEE is working towards strengthening the ESD network in the Asia Pacific region and the conference creates an opportunity to bring the Global Experience and the work being done in the region through its members. The experiences would contribute in the discourse around education for sustainable development goals, help spread and influence education systems and hopefully synergise more partnerships and opportunities in the region. We also look forward to engaging with the outcomes of the Conference.

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Daniel Schaffer

CEO, Foundation for Environmental Education (FEE), Copenhagen, Denmark

Earth Day Network strongly believes that innovative learning opportunities inspire students to be stewards for the environment. We thus support the development of area-specific, student-centric environmental curriculum, provisions for teacher-training workshops across disciplines, and the conducting of programs that provide the students hands-on experience of their immediate environment.

Karuna A. Singh

Country Director - India, Earth Day Network

Sustainability and sustainable development is all about the choices we make to address the problem arising out of ignorant actions of yesterday for short term beneficial gains by mortgaging the future generations' interests.

Mr. Mohan Saxena

MD Ayurvet LTD.

As Nelson Mandela said, "Education is the most powerful weapon we can use to change the world." The only way to build and sustain a more just and sustainable world, to achieve and sustain the SDGs for now and the future, is through education. Now is the time that we must come together, joining our hands and our hearts, to infuse our youngsters, the NEXT and the NOW generation, with awareness of their oneness with all of creation. Education must inculcate in them the knowledge of our inextricably linked existences and the huge ripple impact of all their choices, as well as with the tools they'll need to effect great change. This is the power of linking value based education with knowledge based systems for innovation in climate change and environmental protection. First they have to WANT to create a just and sustainable world and then they need to have the tools build it. I'm so impressed to see the effects of Dr. Ram Boojh and his team in bringing such a powerful group of leaders together. As Mahatma Gandhi Ji said, "We must be the change we want to see in the world." This conference will, I am sure, provide the impetus, the awareness and the tools to become that change!

Sadhvi Bhagawati Saraswati

Secretary General of Global Interfaith WASH Alliance

THEME A
Building Sustainability Education Framework within the context of Climate Change, Environment and Sustainable Development

A1

The Young Researcher Program at Rensselaer Polytechnic Institute: Reaching for the Sustainable Development Goals at the Nexus of Secondary and Higher Ed

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The United Nations' fourth Sustainable Development Goal (SDG) calls to ensure "inclusive and equitable quality education and promote lifelong learning opportunities for all." This goal, which is essential for building capacity to address climate disruption, will only be achieved if there is a strong network working together to transform both education and broader human relationships with the natural world. This research paper will discuss the role of design principles from permaculture (a whole-systems-thinking design process that takes its inspiration from patterns in natural systems to build regenerative systems) as tools to guide the development of the Young Researcher Program (YRP) at Rensselaer Polytechnic Institute (in Troy, New York, USA). The YRP is an eight to ten week after school program which connects secondary students with university mentors to research an issue related to the SDGs and its effects on communities. Ecological Education Literacy Goals (Eco Ed Lit Goals) have emerged from the past seven years of the YRP and help students in the YRP understand how they are impacted by, and impact, broader ecologies. This paper explores, ethnographically, how in the context of a community-based education initiative (the YRP) permaculture principles (for systems re-design) and Eco Ed Lit Goals (for big picture perspective) can help provide youth with conceptual and practical tools to address climate change and achieve the SDGs.

Many permaculture designers use a design process referred to as "GADIE," a highly iterative approach moving nonlinearly between Goals, Analysis, Design, Implementation, and Evaluation (capitalized to signal their specific use here as part of a whole-systems design process). The fourth SDG on inclusive and equitable education, for example, is achieved through an Analysis of the educational landscape in our area, curricular Design informed by permaculture principle #8, "Integrate rather than Separate," and Implemented by bringing together secondary and university students whose success are Evaluated against their progress towards the SDGs. Eco Ed Lit Goals were developed in the context of the YRP, based on the anthropological record of what makes sustainability difficult to achieve, to combat the conceptual and information challenges posed by complex environmental problems. The Eco Ed Lit Goals are always expanding and draw together scientific, media, political, and health literacies. One new Eco Ed Lit Goal, which focuses on understanding potential for change and ways to organize society, was integrated by scheduling a community discussion with the Sanctuary for Independent Media around investigative journalism, helping students identify climate-related questions they are curious about, come up with a plan for investigating these questions, and then develop a creative way to share their findings publicly.

The YRP and this research paper aim to join larger conversations regarding Climate Change Education (CCE) driven by the ambitious goal of *achieving* the Sustainable Development Goals by 2030. This research paper impacts the larger conversation around CCE by providing empirical, conceptual, methodological, and practical contributions. Empirically, this paper is the first to document and analyze

the YRP, which has been running for nearly a decade and has involved hundreds of students. The data analyzed in this paper include class plans, homework prompts and responses, final presentation materials, fieldnotes from community environmental workshops, visits to secondary school classrooms, and reflections from the university students. Conceptually, we leverage design principles from permaculture to inform and analyze the strategies behind the YR program, contributing to a growing literature on educational reform that takes cues from natural systems. This paper provides an invaluable vehicle for taking stock of the YRP's outcomes and evaluating its success and shortcomings. Methodologically, this paper builds on a rich literature that uses ethnography to analyze educational systems and experiences. A unique contribution of this paper involves an exploration of how simple ethnographic techniques were employed by students and teachers as a way of generating data useful for the program's evaluation. Data was generated from multiple standpoints as the program progressed, and interpretation of this data led to ethnographic insights that were fed back into the design of subsequent curricula. Practically, this paper provides schematics of the program structure and interactions, along with excerpts from university students' Sustainability Education course syllabus to offer adaptable modules for collaborative, community-based, and intergenerational education geared towards the SDGs. This paper will advance best practices for bringing together theory and practice, or praxis, for creative and effective CCE. Feedback is essential in this process, as it allows iteration, adaptation, and a growing awareness of diverse contexts and ability to read our current and evolving community conditions (local and global, educational and otherwise). This report's publication and circulation will allow for solicitation from conference attendees, peers, students, and other global leaders working to transform CCE.

Key Words: SDGs, Permaculture, Community Engagement, Higher Ed, Climate Education

Prarambh: A city-wide campaign to transform waste management practices through Educational Institutions

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Dr Lata Ghanshamnani, Co-Founder, NGO Rnisarg Foundation
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INTRODUCTION:

The UN Habitat's Advocacy Toolkit and Guide (2018) which calls for 'Waste-wise cities' recognises the important role that Educational Institutions can play in this mission. Thane-based Rnisarg ('Our Nature') Foundation has lived this ethos, having successfully made 3 schools 'Zero-Waste' schools, while diverting 50 tons of solid waste from landfills in the process. Based on past learnings, a city-wide campaign called *Prarambh* ('The Beginning') was launched on November 24th 2018 to empower students through '*Follow the Monkey*' and '*S-miles*' initiatives to practice responsible Waste and Road Safety Management in educational premises, homes and throughout the city. In the current academic year, 12 schools are registered under *Prarambh*. *Prarambh* uses the concept of unconsciously cultivating right behavioral changes in students. 'Unknowingly' cultivating right habits engage Head, Heart and Hand working in conjunction. Furthermore, to cultivate such unknowingly right habits, the action has to be done repeatedly with awareness.

APPROACH:

The waste management initiative is titled '*Follow the Monkey*' to dissociate the social stigma around waste and provide playful connect to the subject. As the name suggests, 4 monkeys are used as characters to depict the 4 waste types of waste; namely Mr. Green, Mr. Blue, Mr. Red and Mr. Yellow. The entire project is thereafter presented with the aid of the monkeys and request made is to 'Follow the Monkey (FTM)'.

The project is built on the following 3 pillars:

1. Experiential Platform

Presence of an appropriate infrastructure for waste management provides a level playing field for students to perform in school and practice at homes. For this following measures are undertaken:

- Provision of Bins and Segregation posters- each bin type has a supporting pictoral segregation poster placed at the eye level of students.
- Audit system for measurement & record – daily entries are made in templates with signing authorities being students and housekeeping supervisor.
- Management of all types of waste – Standard Operating Procedures are defined.

To ensure smooth implementation and functioning of the system, a 3 fold approach was put in place:

1. For communication: whatsapp groups with school are created along with dedicated webpage for day to day updates.

2. For engagement of stakeholders:

- A *Prarambh* team was created within each institute comprising of housekeeping staff, school administration and teachers. Rnisarg trained team in Solid Waste management using a proprietary *Zero Waste Educational Institute Manual* developed by the NGO.
- Institutes were connected with authorised vendors for pickup of dry waste, biomedical waste and electronic waste. They also managed wet waste within the institute.

3. For periodic assessment: use of monthly audits, and Physical inspection is in place.

2. Pedagogical Interventions
The Prarambh programme is designed to engage 3 H's:

- **Head**: igniting minds through awareness workshops
- **Heart**: providing badges to motivate students, as FTM Marshals
- **Hand**: Reinforcing learnings through action based projects, like, know your plastic, my waste my responsibility, Ecometer etc.

To achieve this, a comprehensive curriculum was developed which includes:

- Waste-management based Projects for students;
- FTM Marshal Program for 7th Grade, which leads initiatives like holding Zero Waste Event in the Institute (using the proprietary *Slash The Trash* Manual developed by Rnisarg) and neighborhood waste collection drives.
- Visit to centralized / decentralized waste management sites to learn best waste management practices being followed.

3. Self-sustaining Project
Follow the monkey Marshal Program is designed for 7th grade students. They are responsible for managing the project for the entire academic year, thereby ensuring that the project will attain sustain year-after-year.

PROJECT IMPACT:

- **Reach**: The program will engage 35,000 students and reach 175,000 beneficiaries (based on a reasonable assumption of 4-member families)
- **Waste Managed**: The program will help divert a cumulative quantity of approx. 50 tons of waste (for 12 schools) in this year. Each waste type will be send to the correct end destination, thereby help achieve follow the 4 'R' principles.
- **Behavioral Impact**: Assessment of Students and staff on periodic intervals to check on change in Knowledge, Attitude & Practice related to SWM, besides feedback on the project Prarambh will be done.

CONCLUSION:
Prarambh believes that in order to ensure sustainability and promote 4Rs, Rethink, Reduce, Reuse and Recycle in the society, a combination of Physical Infrastructure system and awareness module is essential to reinforce the learnings and build a habit. Educational Institutes are the best incubators to cultivate unknowingly right habits in the next generation. Projects such as Prarambh are local solutions to a global problem that can help resolve the urban crisis of waste management.

ABSTRACTS

"Sustainable Development Education"

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ABSTRACT

On the path of achieving MDGs for year 2015, the world was facing new challenges which were recognized as sustainable development goals for year 2030 later. These universal, complex and complicated goals include 17 goals and 169 targets to focus on environmental sustainability while MDGs were set by the Millennium Summit of the United Nations in the year 2000 that included a set of eight international development goals with eighteen quantifiable targets for the year 2015.The formulation of SDG's is a result of many theories and conference, it was started by the father of modern environmental education ' Sir Patrick Geddes' and the term " environmental education" was first used in 1948 at IUCN(International union for the Conservation of Nature and Natural Resources) meeting in Paris. However, historically it is nothing new, many scholars and historians have discussed and documented their concern towards conservation and protection of environment. Finally Earth day was originated in 1970.The concept of sustainable development emerged in 1970s. In 1972, Stockholm conference took a lead and became the First international conference which focused on education for environmental issues. The year 1992 marked as an important year due to UN earth summit which focused on environmental and ecological problem linked with urban development.

This paper is focused on SDG number 13 i.e. climate action. The goal of climate action is related with many other SDGs1. Climate change is the largest modern challenge before the world. The most crucial question is that is who is contributing most to the climate change. It has been said by many scholars that it is the responsibility of developed countries to contribute for the solution of climate change because these are the first one to contribute for the problem of climate change.

This world belongs to everyone so it is responsibility of each person to take care of the environment. It is the high time to think and take actions against climate change. Recently UK and Ireland has declared environmental emergency as an action to this challenge. Further this paper discusses about Environment Education (EE)and Education for Sustainable development(ESD) in detail. The main concern of the paper is to solve this environmental challenge through the education as it is essential key of transforming societal views towards environmental awareness. Sustainable education has many aspects, as it is related to climate change education at school level and higher education. To continue with education of environmental change first we need awareness about the problem and it's causes and effects. The paper will explain some factors which show that how much people are aware about the problem of climate change. Some factors are universities which provide courses of environment, numbers of lecturer of this subject, number of young students aware about it. This paper explains these factors in detail.

At the end, this paper provides a survey based study considering teenager as main target group because it is the tender age of accepting and learning something without bias and their life will be more affected by climate change. Along with teenagers, the target group include graduates, school principal and teachers and some industrialist. The focus points of the survey include questions related to awareness about climate change, their suggestions for the contribution for solving climate change , ranking about solutions such as government schemes related to climate change, curriculum in school and colleges and words of mouth. Not only this paper includes individualism awareness about sustainable development but also it fosters the ideas of making learn individuals about environmental conservatism that it should start at local area to worldwide.

Keywords :- Sustainable Development Goals(SDGs), Millennium Development Goals(MDGs), Environment Education (EE), Education for sustainable Development (ESD), Environment awareness.

1 SDG 2(Zero hunger), SDG 3(Good health and well being), SDG 4(Quality education), SDG 6(Clean water and sanitation), SDG 7(Affordable and clean energy), SDG 8(Decent work and economic growth), SDG 9(Industry innovation and infrastructure), SDG 11(Sustainable cities and communities), SDG 12 (Responsible consumption and production), SDG 14(Life below water). But this paper focuses the linkage between SDG 13 i.e. climate action and SDG4 quality education.

Sustainability Education through Open and Distance Learning Mode in India

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ABSTRACT

The role of open and distance learning institutions is immense in promoting sustainability education. Distance education has a special role in transforming the masses as the appreciation of environmental values is rooted in one's thinking and behaviour. Further, distance education is very successful in linking with sustainability as it connects with learners with different backgrounds and social circle. It is noteworthy that Indira Gandhi National Open University is the pioneer in establishing the discipline of Sustainability Science. A plethora of programmes under the domain of sustainability have been developed in the University to promote sustainability education.

The paper aims to explore the highlight the importance of education for sustainability in higher education. It also emphasizes that distance education mostly caters to the professionals and therefore the outcomes can be sustainable if proper training is provided from the very initial stages.

Keywords: Sustainability, Higher Education, Distance Education, Open Learning.

Why Should a Woman Weep?

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The term "Climate Change" showcases a series of fission transformations. Climate Change never discriminates between genders, but its impacts hit harder on women; consequently, on children. The fact that climate change is hard on women is real, is ubiquitous, yet it is conveniently side-lined from the main agendas, and this shapes into climate health crisis, and life crisis. This paper will discussion the importance of education and empowerment in curbing climate change effects on women and children.
Building context: A study states that 83% of single mothers were unable to return home after Hurricane Katrina for two years [1]. Not just this, a lot of women die during climate havoc as they wait to rescue their loved ones and also due to their movement-restricting-narrow-scope-of-escape attires, like saree & Ghaghara. UN studies reveal that 80% of people displaced by climate change are women. Infant and child mortality rates due to air pollution, dengue, etc. are on the higher side.

Climate change impacts on women also shape into:

- Economic loss & Displacement
- Diseases & lacking access to healthcare
- Household food, water, fuel & resource problems
- School dropouts & early marriage
- Increased burden of caring for young, sick and elderly
- Sexual violence and trauma and others

Coming to health, some of the problems faced by women in urban and rural areas would be: bad indoor-outdoor air quality, skin problems, low nutrition, depression, etc. Pregnant women & new mothers are in the hotlist too. Next, it exacerbates the cycle of poverty – another transformation.

Certain less talked about factors that elevate the impacts of climate change on women (including pregnant women):

- **Economic and social inequality/ disparity**
- **Gender specific roles are also a setback for women**
- **Sensitization and Preparedness is yet to be met**
- **Health Setbacks**

Talking about health hazards, air pollution, both ambient and indoor air pollution are dangerous to women's and children's health, is now a booming threat. Indoor air pollution can be up to 5 times more polluted than the ambient air. And, there are more than 60 different sources of indoor air pollution in the household.

Air pollution can affect anyone of any age, any region. Some of the most noticeable symptoms are: Irritation (eyes/nose/throat); Coughing and Wheezing; Shortness of breath; Chest tightness; Asthma

Attacks and more. But it affects the general bodily system of women even, i.e. menstrual cycle. And, here we would like to bring the smog effects in place.

A study reveals that exposure to smoggy air can raise the risk of irregular periods and even unfavourable effects on hormonal regulation of the females.
Many studies also reveal that prolonged exposure to air pollution affects the pregnant women, due to the improper supply of oxygen to the foetus. Pregnant women may face following issues:

- Premature birth: Pregnant women who are constantly exposed to air pollution may experience the premature birth also known as pre-term birth.
- Low birth weight of the child:
- Sudden Infant Death Syndrome (SIDS): If a woman is continuously exposed to passive or second-hand smoking, then they are at a serious health risk leading to a miscarriage, premature birth, low birth weight, cognitive and behavioural deficiencies, & SIDS.
- Constant exposure to air pollution may cause intrauterine inflammation in pregnant women, which could further affect the child's health right from the foetal phase to childhood and adolescence and they may experience long-term health problems

Empowering By Educating
Education & Sensitization
A "Holistic Education Cell" (HEC) should be built across the country, in every village, town and city. Its composition can be a simple and small one.
- Ability to perform independently

- Ability to enhance disaster preparedness, including balancing emotional quotient

- Ability to enhance the possibilities of revenue generation

Yes, the perks are included.

Inclusions:
Women are under-represented in the global climate discussion. The participation rate needs to increase.
Empowering Self by Gaining Financial Independence
Self-dependence & Revenue Models to be put into use, and should be the brick of constant innovations. Leading by example and innovations should be the way out.
This paper explores various possibilities of finding solutions for fight against climate change. The focus is on easy, viable and simple solutions for creating a sustainable world. And, as you can see, the role of education and empowerment, powered with determination can open up gates for climate change mitigation. Why should a woman weep when she can learn to carry her happiness in her hands?

Strengthening Education for Sustainable Development

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BACKGROUND & RATIONALE

To strive for sustainable development, it is important to address both long term and short term environmental crisis and design a warrantable pathway in accommodating changes as well as gradually reducing its adversity, therefore, bringing the environment back to equilibrium. This task, however, begins with equipping ourselves with environmental education. Education plays a dual role in this process. It is both the aim as well as the catalyst for achieving sustainable development. The role of education has been clearly visible in alleviating poverty of the world. In fact, all of the developmental challenges are inversely proportional to the amount, quality and outreach of education, thus, making it one-stop solution (direct and indirect) to all the global socio-economic-environmental challenges.

AIM

In this proposal, the focus remains on integrating knowledge of environment, specifically climate change, in education and the concerned directive plans in the current education framework so as to trigger behavior change among students and relevant stakeholders towards sustainable development.

OBJECTIVES

- Determine the current status of environmental awareness, especially of climate change among different sections of society
- Develop age-specific understanding and awareness of environmental conservation and climate change among students
- Establish method/means for progressive sensitization of teachers, school committees, boards, etc.
- Utilization of online education platforms as a part of the curriculum or extra curriculum
- Embolden innovation among students for climate change mitigation and adaptation at individual and community levels
- Enroll media for productive dissemination of climate crisis and climate action news
- Foster sustainable development as a moral principle and as a lifestyle than an end goal

ACTION BLUEPRINT

Interventions and innovations within the education framework will be supported through formal and non-formal teaching methods. These interpositions are proposed at the following levels.

- **At Classroom Level**: This phase will include student-teacher interaction, use of new technological methods of learning, introducing environment education in a renewed manner, skills development for students within the classroom, etc.
- **Outside Classroom**: Interventions at this stage deals with teachers, parents, school management committees, and career counseling delivery
- **District or Regional Level**: Proposed activities include positive enrollment of news media, strengthening public information systems, acknowledging traditional conservation practices and skills for customized solution development

- **Curriculum Development & Policymaking**: At this level, changes in the national curriculum will be proposed in regards with effectiveness of teaching in and outside classrooms. This phase will also call for sensitization of political, academic and administrative leaders, national movement, building comprehensive government data on people's perception and understanding and dissemination of knowledge in all languages

EXPECTED OUTCOMES

- Enhanced creativity among students for learning and in teachers for teaching methods
- Equipping students with multiple knowledge sources through online courses, field trips, apprenticeships, data analysis, etc
- Improved infrastructure at schools and institutes
- Enhanced awareness and knowledge of responsible activities among citizens and community involvement to foster the process
- National movement to influence policy making and delivery at central, state and district levels
- With multidirectional interventions, the proposal offers holistic development of education framework for sustainability
- Strengthening and expansion of communities and networks across societies
- Better monitoring and evaluation leading to effective policymaking and keeping implementation activities in check, thereby, leading to effective overall development of education framework

CONCLUSION

The current education system is devoid of impactful methods and processes and merely informs about environmental definitions and facts. In order to successfully integrate sustainability in education curriculum, multidimensional interventions are required - at the school level, district, state and central level and prioritizing climate change and sustainable development as some of the leading pan India campaigns. Also, the focus shouldn't only remain on revising the curriculum but also engaging non-formal teaching methods such as field visits, online courses, classroom practices, etc. right from early school to the university level so that both students and teachers are comfortable with renewed method of teaching.

A7

Integrating Life skills with Environment Education: Lessons Learnt from Surat city Experience

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ABSTRACT

Learning about environment "Knowledge" is possible for today's adolescents due to several reasons like - inclusion of climate change theory in curriculum, special subjects like Environmental Science, School science projects, Government initiatives like Swachh Bharat Mission and overall efforts of schools and organizations to increase the environment literacy.

However, it is not necessary that the "Knowledge" is always translated into "Actions". An adolescent who is theoretically sound with environmental science information may not be following the pro-environment habits or practices. Where does the gap exist between knowledge and actions?

The possible answer lies in Life skills Education (LSE). Life skills are a large group of psychosocial and interpersonal skills which can help adolescents to make informed decisions, communicate effectively and provide self-management skills that may help an individual to lead a healthy and productive life. Eight internationally recognized Life skills involve Problem Solving and Decision making, Critical Thinking, Creative Thinking, Empathy, Understanding Self and Understanding Emotions.

Urban Health & Climate Resilience Centre of Excellence (UHCRCE)1, Surat, in 2018-19, demonstrated urban specific pilot model for LSE in context of various adolescents' appropriate themes and one of the crucial subject themes was "Environmental Education." The model was piloted under Child Friendly City joint initiative of UNICEF and Surat Municipal Corporation.

14 Municipal schools covering 50 teachers and 932 adolescents, 33 Anganwadi centres with 33 workers and 174 Out of school adolescent girls were part of the LSE Program. Trainer teachers and Anganwadi workers were trained and supervised by 25 city Master Trainers.

The Proposed paper shares the lessons learnt in urban specific implementation of Life skills Education in Environment context.

Relating environment education themes with appropriate life skills was the key

Decision making for saving the electricity or saving the water, critical thinking for waste segregation, and creative thinking for climate change communication for example, through a fancy dress competition or drama – these were some examples where modules emerged linking life skills with environment themes. Teaching life skills in abstract manner without relating to context had limited application value of skills.

Integrating the program in school routine

Daily school assembly, prayer, weekly once "Environment" pledge, weekly book reviews, daily good thoughts, chapters from curriculum of science and geography, audio-video discussions as a part of Government Education Programs – these were the some ways in which life skills and environment education is being clubbed with school routine. Administrative work load on teachers and packed school routine offers limited scope to run new programs expecting enthusiastic involvement of schools. However, merging the program with existing school routine has more chances of program to be accepted by schools.

Peer education model works better than "Adults to adolescents" model

Program emphasized on sharing, learning and actions among adolescents themselves. Knowledge exchange through experience sharing, reading environment news together or watching environment movies together, or preparing a skit or drama together was "Peer education model". Message was passed more effectively with higher probability of action when it was from adolescents to adolescents.

Life skills & environmental education will be more accepted if it is interwoven with livelihood education skills

For urban poor areas, neither life skills nor environmental education are felt priorities. Their top ranked priority is developing and sustaining livelihood avenues. Livelihood education is demand by schools, parents and in-school or out of school adolescents themselves. So, integrated model is the answer. Creating artefacts from plastic, paper bags, bags from waste cloths, plantation trainings – such avenues have potential for livelihood. They additionally teach messages of environment education along with life skills.

Multi-stakeholder collaborations in urban areas are must

Urban life skills models will not work if stakeholders are working in silos. Government departments, organizations, civil society and community must join hands to develop fullest potential in life skills and environmental education especially for vulnerable but capable urban adolescents. For example, inclusion of life skills in Swachh Bharat Mission awareness programs by Government, inclusion of climate appropriate recipes in Poshan Saptah (Nutrition week) organized by ICDS for adolescent girls, inclusion of environment plus life skills combination activities in summer camps organized for children by NGOs – these were examples set for informal learning mechanisms involving multiple stakeholders.

Behavior change is a long term process. But simply passing environment awareness messages is of no use if they are not applied in practice. Integrating life skills can be a pathway of more actionable environment education to next generation.

Keywords – Climate change, Environment Education, Life skills education, Surat city

1 UHCRCE is a public private partnership trust established under Health Dept. of Surat Municipal Corporation with mandate of interdisciplinary research, capacity building and advocacy in urban health and climate change arenas.

A8

Quality in Higher Education through combined efforts of Academic and Industry

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ABSTRACT

Professional colleges are the feeders of professional people with the required competencies to the business organizations. Managerial and technical people need various competencies in order to effectively diagnose, understand, explain and act appropriately, based on what is happening around them in their jobs. The purpose of professional education is to equip the students with necessary skills that would help them to face real business situations in their career. This article analyzes that professional students should have professional competencies to face challenges in modern era of globalization, liberalization and privatization. To make the students highly professional, institute and industry partnership plays a very important role. This article also provides a model, which may help the students to become more professional in their approach. The responsibility of developing well qualified professional lies with both the academics and the industry. This joint responsibility can be fulfilled through strong link between academics and industry. Both academics and industry should take the various steps forward to make the students professional and of the attitude of always and continuous learning. At the time of summer training, industry people should guide the trainee in a proper manner to complete the projects. They should make him aware about the company's work environment. Summer training helps the student to know about the company's infrastructure, work procedure, company's products and policies etc.

Keywords: Higher education, academics, industry

A9

Climate Change And Sustainability Interventions – Urban Perceptions

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The issue of Climate Change has never been more relevant than the recent days. Sustainable lifestyle is undeniably a major way to deal with the Emergency. However, for the sustainable lifestyle to be observed, the support and contribution from all the people is mandatory.

Considering the same, we wanted to assess how ready and willing are the people of Surat, a city on west-coast of India which is one of the fastest developing cities,with major migration and hence a lot of cultural diversity. Their willingness will determine the acceptance and success of any sustainability ideas shared with them.

Hence, this study was conducted with the objective to capture the perceptions of the people about climate change, readiness towards their potential contribution for the same and also in the process, informally sensitising them about the impending threat of climate change. Online survey technique using pretested semi-structured Google forms, was used for the study. Convenient sampling technique was adopted, considering the methodology.Prior piloting was done on 88 respondents who attended an event organized on World Environment Day. Based on the result of the same, a modified questionnaire was used for the study, for which 257 responses were received.

The mean age of the respondents was 37± 12.8 years (17 to 74 years) with almost same sex ration. A total of 16.3% were students, 3% unemployed and the rest employed in some kind of work.

KNOWLEDGE, PERCEPTION AND PRACTICES IN RELATION TO CLIMATE CHANGE AND RELATED ISSUES.

Majority, 93.4% of the respondents admitted that climate change is affecting their day-to-day life. Heat wave (87.2%), frequent weather changes (83.7%) and frequent natural disasters (76.7%) were major outcomes of climate change according to the respondents. Pollution (91.8%), Industrialization and deforestation (85.6%) and urbanization (60.7%) were considered to be the top causes. The most interesting and encouraging observation was to note that 87.9% opined that we, ourselves are responsible for the climate change with 92.2% responding that as individuals, we can contribute towards dealing with climate change.

Almost everyone (96.88%) in the study unanimously opined that planting trees is the most important measure to curtail the impact of climate change. However only 40.46%said that they routinely plant / nourish trees.While 87.9% agreed that water conservation is important, only 41.6% could practice it in daily life. Similarly, while 87.5% felt that decreasing plastic use is important, 46.6% said that they were practicing it in daily life.

READINESS OF THE COMMUNITY AND SCOPE FOR SUSTAINABILITY INTERVENTIONS

While checking further on their practices and challenges while doing them, we observed that despite 92.99% believing that climate change is happening, 87.15%knowing what causes the same and 85.2% knowing what they must do to prevent climate change, 17.89% of the respondents were not able to practice environment friendly activities in daily life. Almost half of the respondents were not satisfied with what they are doing as compared to what they can do for climate change. Furthermore, a sizable number of respondents put forward their challenges like need of guidance for adopting environment friendly practices (73.5%), environment friendly products being costly (45.9%), lack of availability of such products with ease (56.4%), time consuming nature of such practices (34.6%) and that such activities were complicated (23.73). On the other hand, we also noted that a major portion of the population (81.3%) did not feel that practicing environment friendly measures bring down their status in the society. This finding is supported by another observation whereby 70% of the respondents said that they were comfortable practicing new methods which are environment friendly.

Considering the above observations, the scenario of the city shows that people are aware about the climate change and related issues and are also equipped with a reasonable amount of knowledge for the same. The most significant observation is that people realize that we, ourselves are somewhere responsible for the crisis and hence we surely can contribute in reducing the impact of climate change as much as possible. They are practicing one or the other environment friendly modality in their day-to-day life, are able to enlist the challenges while doing so. They have also expressed their need for guidance in this area along with willingness to practice newer modalities and contribute towards minimizing the impact of climate change. In such a scenario, if some tangible and sustainable ways could be incorporated into the Government Policies, it would help in mainstreaming of these much-needed modality of ‘sustainability education’.

Thus, the community is receptive for sustainability education and hence is more likely to give positive outcomes with focused efforts.

A10

Quality Education for Sustainable and Eco-friendly Development

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INTRODUCTION

Education is an essential component of living beings, especially to human from his childhood to be a capable individual to understand, innovate, analyze, plan, design and act efficiently and manage effectively with high moral and spirit towards the well being of society, interdependent relationships and natural resources assuring sustainability at spatiotemporal scale. Increased population need and greed have set-aside value education, its rationality and relevance at present, leading to climate uncertainties and Socio-economic diversities, regionally and globally. It is primetime to realize collectively and establish unified cum relevant quality education system in order to achieve targeted equitable and sustainable development goals.

METHODOLOGY

This paper assesses the role of education in general, changes in pattern, scope, dimensions and objective of education, impact of prevailing conventional and nonconventional system of education and steps to establish a uniform cum relevant quality education system. Veda [1], purans, regional and global culture dictates the role and importance of education, knowledge, skill and wisdom which can be attained at Himalaya as well. Education is not just to maintain and carry over routine work; it is much more than livelihood which makes difference from animal. Without knowledge and wisdom human beings are considered as animal. Time immemorial since evaluation of creature education and trainings are in use but the form, dimension and objective are being changed and affected due to need, scope and prevailing policy of authority. After independence the education system more or less remained as established by Mycale except some traditional and privately operated Gurukul, Madarsa and missionaries. Energy to establish Nai talim of Gandhi and higher education system to meet the aspiration and interest of the nation disappeared over year. However, craze of being educated and acquiring higher education increased to achieve ranks and files of service. Which further yielded as involvement of private parties in imparting conventional and non-conventional degree based education as business in parallel to state. One has to realize education is not business, it is responsibility of state/nation and individual in the interest of the masses and nation. It was known as charity (Gyandan). Result of education depends upon the priority of language and comprehensiveness of contents, i.e. Rope ped babul ke to aam kanha se hoi (one can't expect mango by planting the tree of babool). Now education has become irrelevant with respect to employment as money, mussel and management has taken over the appreciation in society. Government has weakened his responsibility by sharing its responsibility and authority to private body. Social disintegration and deteriorating education at primary to higher levels resulted in education towards awareness and skill, which was suppose to be the matter of common sense and custom, generated as the byproduct of Sanskar and tradition. Higher education and research are understood to be consumed and nourished by the

developed country. Certainly we need to reverse the gear to march forward, following the essence of USA and RUSSIA with our own quality based sustainable and uniform education policy.

FINDINGS/RESULTS

If we keep aside the area and population density of different states of the Indian nation and have a look on the status and decadal growth of primary and secondary education in states index values are alarming and irreversible worst stage or on the verge of collapse in few states. State level statistical data of Niti Ayog website [2 and 3] shows there is rise in percentage of primary schools by 2 to 14% during year 2004 to 2016. Growth of private schools in Andhra Pradesh, Gujarat, Uttar Pradesh and Rajasthan was at higher side,

while growth in Haryana was by 28% (double) to be all nearby 33%. Chandigarh, Delhi, Goa, Kerala, Meghalaya were already having strength of 40 to 60% private primary schools. Also it is interesting to note that percent of private schools in Chandigarh and Meghalaya gone down over a decade, which might (as 2004 data is missing) had happened in Delhi and Goa as well. If we look at the state of Bihar private schools increased from 1% to 4%, but maximum students are left to attend private tuition. Madarsa schools are higher between 7 to 12 % in Bihar, Jharkand, Kerala and Assam. In secondary education also the students in ratio of teachers and classrooms are worst above 55 and 89, respectively, which go on increasing in Bihar in respect of other states. Similarly ICT lab % in secondary school increased in all states but decreased in Bihar. Apart from lack in adequacy of nos. of school and colleges required, students and teachers or class rooms ratio desired, insufficient labs in operation, non-uniformity in syllabus and salary to teachers, there are various states' board, CBSC, ICSE, University's boards including syllabus which make very difficult to compare or establish the quality of education at regional and national levels. Students at present are declared having increased ICT application but decreased employability or being blamed that they lacks in social obligation and sustainable climate consciousness. Because they have perceived the priority of consumerism, fashion, lavishness and money power in this era of globalization against the need and culture of Indian conditions and traditions.

CONCLUSIONS

The national education policy 1986 (modified in 1992), opportunity to ICT skill to students in 2004 (revised in 2010) have certainly helped [4] in improving the condition
and new national education policy have all ready launched and further scope exists to
suggest for quality and sustainable education leading to sustainable development,
mankind and nature. It is important and necessary to have uniform syllabus, education pattern,
board and examinations. At primary/basic level: i) one national language and one regional
language, ii) morals and ideals, iii) Natural Science (Phy, Chem and Geography), iv) Social
Science (Social, economic, home and political sciences), v) Art of application (Yoga, dance,
music & computer), vi) Mathematics & computer, and vii) an foreign language (optional) are
need to frame and establish all over the country.

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Keywords: Quality education; sustainability; primary and secondary level; uniform board and syllabus; nature and climate.

A11

Imparting Awareness Of 'Green' Laundry Practices In India: Need Of The Hour

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ABSTRACT

Laundry washing is one of the most important task performed daily in every household across the globe. People who perform laundry tasks at home often have the ultimate aim to achieve efficient cleaning results. The environmental impact of their actions is of minor importance to them. From an in-depth study of related literature and various life cycle assessment (LCA) studies on clothing and textiles, it is evident that use phase of the garment is the most polluting one and most of the environmental impact comes from laundering. Examples of resultant impacts include water pollution, eutrophication, greenhouse gas emissions and potential toxicity. Although water and energy consumption is greatly influenced by the technology of washing machine and type of laundry detergents, however, at the same time it is the consumer behaviour and knowledge which has an ultimate impact on the sustainability of the washas they decide the product, method and frequency of washing and drying. Therefore, this study aims to provide new empirical research into the environmental impact arising from consumers' laundry behaviour in India. Information on consumers' laundry behaviour was collected from 384 households located in Delhi using a close ended standardized questionnaire.

The results of this study show that the majority of the consumers did not know about the difference in resource consumption by different washing machine technologies. In most of the cases, garments were observed to be washed frequently and washing machines tend to be under loaded. Majority of the consumers were found to be unaware about the environmental impacts of laundry detergent. From the results obtained, it was concluded that developing green ways of doing laundry and to sensitize consumers on the environmental impact of their actions are vital to minimize the impact of laundry washing on the environment.

A12

Environmental Education and Communication as a Driver for Societal Transformation

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Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is a federally owned enterprise supporting the German Government in achieving its objectives in the field of international cooperation for sustainable development. GIZ provides services in international cooperation for sustainable development, through projects and programmes in countries worldwide. The Agenda 2030, comprising the Sustainable Development Goals (SDGs), serves as a guiding framework for GIZ work in the international cooperation.

The Agenda 2030 strives for a transformative approach that requires a broad shift in values, norms, beliefs, attitudes and practices towards more sustainable societies. This great ambition cannot be achieved by governance approaches only that may form extrinsic motivations. Various forms of education (formal, non-formal and informal) in a wider sense are essential to enable societal change as an intrinsic and therefore long-lasting motivation of actors. For international cooperation programmes aiming at contributing to transformative change processes in a society, there is need to focus on individual and social groups' knowledge, attitudes and practices.

In the current debate on sustainable development, environmental education and communication (EEC) are the driving forces to facilitate social and experiential learning on environmental issues. Therefore, EEC plays a key role in the achievement of SDGs. In this context, the learning goals of the Agenda 2030 are as ambitious as the SDGs. Loss of biodiversity, degradation of ecosystems, or climate change challenges cannot be addressed without an understanding of the complex interactions between ecological, social and economic factors.

In this context, EEC brings together formal, informal and non-formal education and communication approaches to empower people to become informed citizen and take action, to take part in local, national and global governance, and to influence decision making processes through peaceful participation. GIZ was one of the first organizations worldwide that analysed environmental education after the Rio Conference in 1992. The adjoining action tree of environmental education and communication incorporates partly overlapping fields such as communication, non-formal education, formal education, vocational training and awareness raising. As these fields have different potentials for immediate action, they can be used for short, medium and long-term education and communication strategies.

Therefore, the future EEC approach of GIZ supporting the Agenda 2030 should promote transformation processes towards environmentally safe and climate-resilient societies through social learning and negotiation discourse. EEC for societal transformation should be based on a new quality of public and private human capacity development concerning contents, methods, instruments, creativity and communication. This calls for a strategic design of EEC in which cognitive and affective forms of learning as well as interactive media, conventional and digital, complement each other in a holistic way.

Thus, privileged and non-privileged members of society alike could shape social transformation processes towards a sustainable future.

Some case studies presented in this paper have tried this complementarity by means of edu- or infotainment, combining the sharing of hard facts with social learning and entertainment in games, exercises, road shows, theatre plays or the performing arts.

The future EEC portfolio should be an integral part of transformative projects concerning economic development, consumption, mobility, etc. instead of a belated add-on to existing environmental protection projects. This needs a type of EEC which creates an enabling environment and promotes sustainability among all the stakeholders. It has to be kept in mind that EEC alone will only be successful if combined with a proper policy framework, law enforcement, and incentive-based instruments.

Keywords: Environmental Education and Communication (EEC); Transformative education; International Cooperation; Asia; GIZ

A13

In-service training of Urban Local Body functionaries for Swachh Bharat Mission (Urban)

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ABSTRACT

National Institute of Urban Affairs (NIUA), a think tank supported by the Ministry of Housing and Urban Affairs (MoHUA), Government of India, conducts research on urban issues and challenges, prepares policy inputs for MoHUA and conducts training especially for urban local body functionaries, including those working in municipalities, municipal corporations and others. The research focuses on Sanitation and Solid Waste Management (SWM), two issues which are directly under the purview of ULBs. NIUA has been working on improving the capacities of the ULB functionaries since the 1980s. Through the National Urban Sanitation Policy (NUSP), Jawaharlal Nehru National Urban Renewal Mission (JnNURM) and now the Swachh Bharat Mission Urban (SBM-U), NIUA has trained several ULBs in not only technical aspects but also in operational and financial aspects with a view to improving these functions in the cities and towns of India. The objectives of the Swachh Bharat Mission (U), which is Clean India Mission in Urban areas of India, is to make all cities and towns Open- defecation Free (ODF) and garbage free by October 2, 2019 as a mark of respect on the occasion of his 150th birthday to Mahatma Gandhi, who pioneered sanitation as a national mission along with the independence movement.

Towards this end, NIUA has conducted three phases of the Training cum Exposure workshops in 2016, 2017, 2018 and would be conducting similar workshops in 2019 for the ULBs. These comprise orientation, technical sessions as well as field visits. The pedagogy of these workshops is based on Experiential Learning Theory (ELT), with suitable innovations, and was employed for educating through first-hand experience. It lays emphasis on the fact that apart from traditional classroom learning, skills and experience are acquired through field research, internships and other practical exercises. NIUA trained 647 officials from 286 ULBs in 2016 and 2017. The training was delivered through five day workshops in Delhi with two days of field visits. . During 2018-19, coverage was extended to include 1789 ULBs of the country. For this purpose, NIUA partnered with 13 reputed Training Entities (TEs) for conducting 80 three-day city- cluster workshops in 43 locations spread all over India, training 3439 ULB participants comprising Commissioners, Mayors, Councilors, Municipal Health Officials, Engineers, Sanitary Inspectors and some Administration Staff.

An evaluation of the efficacy of the ELT model was carried out through a research questionnaire, filled by the participants during the workshops. The responseswere analyzed for their understanding and implementation of service level processing parameters in various sizes of ULBs in various states. The understanding regarding sanitation and SWM and that of the goals to be achieved were derived from the

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responses of ULB functionaries from five states namely Madhya Pradesh, Jharkhand, Odisha, Tamil Nadu and Telangana which were compared for their respective performance in 2017-18 and 2018-19 using appropriate weightages.

Although survey and ranking of a limited number of ULBs were carried out in 2016 and 2017, MoHUA conducted independent surveys and evaluation of the performance of over 4000 ULBs to check ODF and Garbage free status in January 2018 and January 2019 as indicative of their performance over 2017-18 and in 2018-19 respectively. These were called Swachh Survekshan (SS) which means Hygiene Surveys and provided city wise and state wise ranking as well as a measure of individual performance in the form of star rating introduced during the SS 2019, which indicated the city's achievements in the Sanitation and SWM parameters as described in their respective value chains.

Improvement or maintenance of status quo in the Education Index (EI) developed, were compared with the Swachh Survekshan (SS) results for those states from SS 2018 and SS 2019, which showed significant correlation, indicating that the pedagogy model was appropriate for the in-service training that is required for the Swachh Bharat Mission to improve sanitation and solid waste management in urban areas.

Key words: Solid Waste Management, Swachh Bharat Mission Urban, Experiential Learning Theory, Urban Local Bodies

A14

Attitude and Perspectives of Social Work Trainees and Faculties towards Climate Change and Sustainability.

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Climate Change and Sustainability is the talk of the hour, which is highly deliberated, discussed and debated across the globe in various forums. The raise in carbon emission (Greenhouse gases) has led us climate change especially rising of temperature. Climate action through policy making, activism, advocacy and lobbying, is one thing which is most discussed in present times to confront climate change issues and problems. So apart from climate action which is a management aspect to encounter the climate change problem, we need a preventive aspect to confront future problems. So, this is when Sustainable development and sustainability comes into action and is advocated as the solution for this from a preventive attitude.

So, this study tries to probe and find the attitude and perspectives of social work trainees and their faculties/ professors/ lecturers to gauge the amount of awareness and knowledge they have towards climate change and sustainability through interviews and focused group discussions. Professional Social Workers are seen as change agents and facilitators of change, so it is very important for this group to have good awareness and knowledge on climate change and sustainability, which being the very important talk of the present time. This study gain more importance since Professional Social Work community has very good rapport with the marginalised groups like side-lined genders, slum dwellers, fishermen folks etc., they will be most effective in sensitizing marginalised groups on climate change issues, so it becomes very important for the social work fraternity/ community to get sensitised about the issue.

This study has good scope to suggest potential elements of change in social work curriculum and teaching pedagogy/ practice to make the social work trainees realize the fact and make them act towards climate change. The findings from this study can also help and support other researchers who probe in this area.

Key Words: Climate Change, Sustainability, Social Work Trainees & Faculties, marginalised groups

ABSTRACTS

A15

Air pollution & its effect on health. -with a special reference to National clean air program (India)

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Air pollution can negatively impact our day-to-day lives by causing respiratory illness that might lead to more absenteeism in work and school life. Children being the most vulnerable group get exposed to air pollution in early childhood easily, hence reducing their lung capacity that would persists throughout adulthood. Hazardous Aerosols (floating dust) or particulate matter especially PM2.5 and PM 10 majorly present in the air causes pollution. About 99% of South Asian countries fails to meet the World Health Organization's guidelines in particular the of PM2.5 and PM10, Among that India is severely affected by air pollution, leading to 1.24 million total deaths recorded in the country during 2017. According to 2018 world air quality report Region & City PM2.5 Ranking IQ Air visual out of 15 top most polluted cities 13 cities were of India, Gurugram being the top most polluted one. According to United States Air Quality Index (US AQI), India is considered as an unhealthy place to stay because pollution is affecting the livelihood and the health of the general public. To address the problem, the government of India under the Ministry of Environment, Forests and Climate Change launched five year National Clean Air Program (NCAP) in January 2019. The major motive of NCAP is to set up National air quality monitoring network, to build capacity for air pollution management, and strengthen public awareness about the dangers of air pollution. By 2024 NCAP has strategies to bring down the levels of deadly particles present in air (PM2.5 and PM10) by 20 to 30%. This paper is mainly to insulate the effects caused by air pollution in children's health and their education, it also highlights the possible strategies of NCAP and the leading drawbacks of the program. Other measurements that can be taken care to reduce air pollution is through public, private and people's partnership.

***Keyword**: Air Pollution, Children Health, NCAP, Public, Private and People's Partnership.*

A16

The Cultural Ecological Context of Nutrition Education

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As the definition of health by the World Health Organization goes, it is neither an object nor a process that can be extricated out of any number of given facts of human life. Rather it is a condition characterized by complementarity between physical, social and socio-biological elements that make up the life of a human being. Thus, dissonance between any constituent elements leads to a state of non-health. Therefore, it is the responsibility of every society to provide a framework of physical, socio-biological and social conditions that is conducive for the improvement of health of its members. One of the major components of this framework is nutrition. Primarily, nutrition is the physiological process of assimilation of external organic factors by 'living cells' and tissues to compensate the effects of the wear and tear of body. Nutrition is a much more complex process among humans as they live in a larger ecosystem and cultural environment. This complexity is defined in terms of the patterns of production of food and consumption of the food produces. The dominant nutrition pattern in India has been to consume calories based food instead of protein and vitamin rich food. This leads to qualitative nutritional deficiencies rendering larger sections of population incapable of competing with diseases and subsequently resulting in general physical and mental lethargy. This situation is not conducive for larger social development. In fact the quality of nutrition is directly related to health and productivity. If there is low nutrition then there is low health which lessens the quality and quantity of labor input. If we are able to define development scales in the context of decentralization of planning, equitable distribution of available resources and investment in human capital, then we will be able to develop sturdier models of development. These alternate models of development will consist of smaller systems of input of resources, direct monitoring of resource utilization and equitable distribution of outputs. This model necessitates existence of sociologically and culturally viable models of social organization. These models need to be built within the fabric of the still transforming rural society. A nutrition education program for rural communities which is looking at the cultural aspects of production and consumption of food satisfies the test of an alternate development model. The need for such a program is determined by the (a) the nutritional status of the target group; (b) the presence of a scientific perception about food consumption in the target group; and (c) optimum carrying capacity of the ecological niche of a target population. More than half of Indian population still lives in rural area, and poverty is an important facet of a large proportion of rural population. Technically, it is possible to treat it a village community as a micro-system of (a) integrated social structures; (b) reciprocal social and economic transactions; (c) defined communication networks within the community and of the community with larger social system; and (d) a common ecological niche. Therefore, it is not difficult to prepare a model of the village community compared to other social organizational forms. The practical benefit of this condition is in the form of a potential nutrition education framework which progresses with regard to (a) nutritional status of a family; (b) nutritional sources accessible to the family; (c) the role-status hierarchy within a family and differentiated consumption of different items by individuals in a family (d) land – functionality of a community; and (e) attitudes and beliefs toward food

A17

Maximizing waste cooking oil potential- Biodiesel production and value added products

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Biodiesel is an eco-friendly, renewable, carbon neutral fuel that can be produced from both plant oils (edible and non-edible) and animal fat by a chemical process known as Transesterification. A stand out advantage of biodiesel in contrast to other renewable energy options is that it can be used in existing infrastructures directly or with slight modifications. Existing infrastructures mainly include diesel engines, diesel generators and diesel pump sets. Since animal fat and other plant based edible oils such as sunflower, soyabean, palm etc. are meant for human consumption alone; waste cooking oil (WCO) produced by hotels, restaurants and other food joints across urban establishments presents a huge potential to be tapped for biodiesel production.

Biodiesel could also provide environmental and economic benefits to a particular region or to a country. By sustainably tapping the potential of WCO, can help partially offset a country's demand for petroleum diesel thus providing large savings to a country in terms of foreign exchange, much needed energy security and self-sufficiency as well as provide employment opportunities. India like any other nation is completely dependent on petroleum (fourth largest importer of crude oil in the world) and thus emphasizing the need to switch to clean renewable fuels all the more critical. Also, the impact of petroleum based fuels is already well proven and documented the world over. Climate change and Global Warming are now the most widely spoken topics at global climate summits and conferences. With the world facing a climate emergency as this abstract is currently being written, the call for action at the ground level is immediate and long term.

I hail from Bengaluru(10 million people in 2017) which has grown from a 240 sq. km lung space to a roughly 720 sq. km concrete jungle over the past 15 years. Population growth has had a direct impact on many service sectors with special mention to that of hotels and restaurant chains. Hotels and restaurant chains are major sites of WCO.In 2009, based on a survey I conducted, the city had a network of about 4200 hotels and presently the numbers are in excess of 5500. The total WCO according to the survey then was roughly 15,000 litres/day. The quantity could well be over 20,000 litres/day currently. This number may not be significant enough but nevertheless useful in mitigating environmental challenges.

Owing to economic factors, biodiesel alone cannot sustain as a business or enterprise. Thus, to improve on this aspect, my study emphasizes on not only producing biodiesel from WCO but other value added products from byproducts generated during the biodiesel production process. Glycerine, a major byproduct of biodiesel production is being converted for hand wash liquid soap production. The wash water, another byproduct of biodiesel production is initially treated and is currently being investigated as a herbal tank wash liquid. The concept is based on circular economy and the whole economics is being developed.

Why WCO?

In Bengaluru, for many years now, it was believed that the WCO generated in hotels and restaurants had been sent down the drain. This is not entirely true. Some hotels do adopt this practice but that is relatively a small fraction (roughly 5%) of the total WCO generated. The enforcement of strict environment legislations to deter hotels from doing so is more or less absent across the country.

During, the survey it was noticed that the WCO generated by top end restaurants such as 5 and 4 star hotels was actually being sold toroad side eateries and food vendors in Bengaluru. Further these street vendors selling fried stuff find top hotels and restaurants as ideal suppliers of cheap WCO. This proves economical to these vendors as they cannot afford/unwilling to purchase fresh vegetable oil available in super markets and other retail outlets which is usually priced over 85-90 INR/litre. The selling price of WCO varies anywhere from 28 INR/litre to about 40 INR/litre depending on the quality and source of WCO.

Generally top hotels (5 & 4 star) usually use their oil once or twice as they have to ensure quality food is being served to their elite customers. This oil is generally straw coloured indicating less rancidity and is sold at 40 Rs/litre. The oils that are very dark coloured and thick indicate higher levels of rancidity and usually sell anywhere between 25-35 INR/litre.

Food fried in such poor quality oils tend to have long term and/ordetrimental effects on humans who consume them. This in turn could have overall negative health impacts on society as a whole impeding a nation’s progress towards development. To deter the consumers from taking such food, the oil sale from hotels to the street vendors need to be diverted for biodiesel production.

A18

Environmental Awareness through Education

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Education is that fire which removes the darkness of ignorance and makes a human being aware of his surroundings. Our surroundings are constantly changing and thus, we are in need of skilled workforce who can address the issues of changing climate and environment degradation. In this era of gadgets, man has gone far away from nature; thus there is an urgent need to create a sense of responsibility and belongingness towards our mother earth. Increasing greenhouse gases emission, urbanization, depletion of natural resources, acid rain, deforestation, ozone depletion, desertification, etc. are major threats to environment on earth. In order to tackle these challenges, holistic knowledge about life sustaining environment is necessary. Environmental science helps in bridging the gap between the knowledge of the ecosystem and the dynamics of these environmental problems. Environmental science integrates approaches of various academic disciplines to study the structure and function of our ecosystem. It helps us to understand the causes, effects, and find solutions to different environmental problems. Environmental education is thus necessary to protect and manage environment, use the present resources optimally and above all, to ensure the survival and improve the quality of life. Students are the future of tomorrow, thus it is imperative to make the students aware and skilled enough to identify and solve the environmental problem in a green way.

Environmental education imparts:

- A sense of responsibility and solidarity among countries and regions as the foundation for a new international order which will guarantee the conservation and improvement of the environment.
- Shows the economic, social, political and ecological interdependence of the modern world; thus acquire the knowledge, values, attitudes, and practical skills to participate in a responsible and effective way.
- Succeeds in making individuals and communities understand the complex nature of the nature and the built sustainable environments.

Recognizing the various environmental problems and the need to generate awareness, various steps are already taken by the government such as making environmental studies compulsory at all levels of education, introducing various campaigns such as National Environment Campaign (NEAC), to spread awareness about the environment, initiating training programs such as Environmental Education And Training (EEAT), to enhance the understanding of the relationship between the human beings and the environment. Here are now Wildlife Conservation Initiatives taken by the Indian Governments such as PROJECT TIGER and CROCODILE CONSERVATION PROJECT etc..to save the endangered wildlife. Ironically, awareness towards environment is the need of the hour and all stakeholders have to be taken into account including ordinary citizens, big corporates, policy makers, politicians and educators. No long term conservation efforts can ever be successful in any nation without intervention among all; it is just not possible to preserve our natural ecosystem, environment,

virgin forests and majestic wildlife wholeheartedly. Along with them, we need to have awareness among the tribal people as well as these are the communities that live closest to the environment around them. These communities are heavily dependent on their immediate environment for their daily sustenance. Unless these communities are made a partner or beneficiary of their natural resources and made important stakeholders in the process of conservation of environment; no effective and long term solution to the perennial challenges of conservation can ever be realistically made.

Teach For Green is working at the grassroots level of India to develop ownership and mindset towards environmental sustainability so that young minds and communities can follow sustainability practices. We are taking steps to educate future generations to not only think of solutions to reduce pollution, improve waste management, encourage water conservation, increase energy efficiency, etc. but also help them realize the implications of future disaster; so as to inculcate in them a sense of belonging to the surrounding environment and to tackle any environmental issues that arises, effectively. We also aspire to let them understand the perils of overpopulation in their fragile ecosystem. Teach For Green, through its experiential learning cum Do-It-Yourself 'Green School, Green Community' program is giving exposure to students on environment related concerns and making them understand the essence of flora and fauna so that they can adopt and promote sustainable practices in their communities. Till now we have been able to achieve a bond between Communities and Schools, 30% reduction of daily plastic use among locals, practice of kitchen garden and hanging garden in 1490 houses which uses compost preparation and the produce organic fertilizers. With participation from 1,279 students in Delhi region and 6,685 students in Champawat, Uttrakhand region; we prepared approximately 2000 seed balls and could modify barren stretches of land into lush green landscapes.

Therefore, with the support of all the stakeholders and well-wishers we have been able to achieve milestones. However, we still see ourselves as a growing organization that is constantly striving to create larger impact with regards to sustainable practices

A20

Climate change awareness among different social strata based on age

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ABSTRACT

Environmental change is radical progress in temperature of earth influencing entire total populace to their centre and furthermore their occupation at the worldwide level. Youngsters, youth and senior native of society can help in diminishing the impacts of environmental change. Imaginative thoughts and devotion can assist the world with saving it from this fiascoes however point is that "is the general public mindful of this developing issue? Do they have any thought starting at how to decrease it? How might they add to diminishing environmental change impacts? Also, how might they spread their words to each person of the world?". The survey was conducted with 200 people from varied age groups ranging from school students to senior citizens. The majority responded with a positive note about the reality of climate change. However, the figures related to the student category was not satisfying which might be an indicator of non-inclusion of the subject in the curriculum. Salaried employees despite being aware of the serious phenomena still didn't take any action out of concern. Thus organizations must make it compulsory to incorporate atmosphere protection exercises as a piece of corporate social responsibility. Not many individuals partook in atmosphere protection exercises which shows that there must be severe arrangement definitions. There was no significant difference in relation to gender and participation activities. Again it was found that awareness creation was low and there was no significant relationship between awareness and sustainable actions. Media had a critical commitment to creating mindfulness among all the age gathering. youngsters take in numerous things from TV, which they recollect till their passing. After this survey, we realised that there is the earnest requirement for making mindfulness with respect to environmental change among various age gatherings. Legitimate coordination between various age gatherings can prompt a mass development and adjustment towards battling environmental change. Climate change awareness is much needed for public support and adaptation.

Keyword: Social responsibility, Awareness and climate change.

A21

Sustainability Awareness

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ABSTRACT

Sustainability in the 21st Century has become a question for the mere existence of the biosphere and human civilization. For ages Climate Change has been the most prominent cause for resource depletion, the varied changes in the climate has adversely affected the biosphere and therefore has sparked the emergence of creating awareness regarding the concept of Sustainability and its related factors. Humans are the most integral part of this planet; whose actions defy the current operations conducted by the intergovernmental organizations. The Sustainable Development Goals (SDGs) are a part of the UN's post-2015 development agenda where climate is one of the major focus areas. In the recent years, an upsurge in the surface temperature has catalysed the degradation of Air and Water Quality around the globe, making Air Quality Index and Parts Per Million an indispensable part of Sustainability where AQI measures the constitution of pollutants in the air, PPM measures the mass of contaminate per unit volume of water. Once broached the current condition of air and water around the globe the reality of climate change can hence be proven. The survey was conducted in order to assess the level of awareness regarding the concepts of sustainability amongst the population. The focus of the survey was to analyse the knowledge of terms such as Air Quality Index and Parts Per Million. A total of 100 responses were collected with respondents comprising of all the age groups and varied professions. The research instrument used for data collection was the survey-questionnaire method. The survey conducted depicts that the awareness regarding the SDGs is maximum amongst the millennials and least amongst the senior citizens. Irrespective of the age and gender the familiarity with AQI and PPM is relatively less. The student's inquisitiveness makes them acquainted with the information. Due to the rapidly changing business environment the salaried keep a close watch on the environmental changes but they are ignorant with its concepts.

KEY WORDS- Sustainability, Air Quality Index, Parts Per Million

A22

Water Education for Sustainable Development through Advocacy, Awareness and Capacity Building for IWRM

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ABSTRACT

Malaysia has, since the turn of the 21st century, formally adopted Integrated Water Resources Management (IWRM) as the way forward to sustainably manage its water resources. This paradigm shift has also been embodied in the National Water Resources Policy formally launched in March 2012. The adoption of IWRM marks a clear shift away from past fragmented and sectoral management practices. The recent endorsement of the United Nations Sustainable Development Goals (SDGs) by Malaysia has further reiterated that IWRM will be implemented at all levels by the year 2030. Despite the formal declaration and adoption of the IWRM policy, its implementation to-date has yet to gain adequate traction on a national scale. Fragmented management of the water sector both at the Federal and State levels is a legacy from the past which continues as the institutional norm. There is a need for IWRM Awareness Raising, Advocacy and Capacity Building (AACB). This includes training and education programmes, modular and material development, communication and delivery system, facilities establishment, and appropriate governance mechanismsto improve the current water management system and practices in Malaysia, as well as ensure local participation and governance. This approach will also polish the shortcoming through the mobilization of all institutional and community stakeholders towards the implementation of the IWRM agenda nation-wide.

Keywords: Water Education, Sustainable Development, Advocacy, Awareness, Capacity Building, IWRM

A23

Sustainability Education Framework Approach: Challenges, Concepts and Strategies

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ABSTRACT:
Education for sustainability is becoming a critical component in achieving a sustainable life and protecting our planet and human habitats. However, a review of the sustainability literature reveals a great deal of confusion and misinterpretation regarding the concepts, themes, and goals of education for sustainability. Education for sustainability, including the themes that should be derived and taught, lacks an interdisciplinary conceptual framework. In addition, the literature of education for sustainability mostly lacks the aspects of urban and community planning and the significant contribution of the planning profession. This paper proposes a new conceptual framework, *Sustainability Education Framework*, which is composed of concepts that derived from different disciplines. At the heart of the conceptual framework rests the normative category and its concepts. The epistemological foundation of the conceptual framework of education for sustainability is based on the unresolved paradox between 'sustainability' and 'development'.

Keywords: sustainable development; pedagogy; teaching; theory and practice; urban planning

A24

Transforming Higher Education towards Sustainability and Wellbeing – COLAGE

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ABSTRACT

India has a dynamic youth population that have the energy and the enthusiasm to shape the future of this nation. A future that is based on universal values of societal and environmental wellbeing, equality, dignity and justice for all. Educational institutions are equipping young professional with numerous skills and abilities to contribute in different arenas such as engineering, technology, science, architecture, finance, management, etc. On the same lines social sciences and development institutions create professionals who choose to work on social and environmental issues. However, the problems that we face in our societies today, whether it is poverty or environmental pollution, are quite complex and often require solutions that are not only social-sciences based but also technical solutions that come from other disciplines such as engineering, architecture or management. Unfortunately, our education system makes the choice mutually exclusive; i.e. to serve in society one must study humanities/social sciences. A huge potential exists here in the way existing systems of education can be transformed to work towards environmental and societal development. COLAGE (Community Outreach for Leadership in Action and Generative Engagement) is an initiative to address this need. It has been designed for students, from higher educational institutions belonging to different stream such arts, science, engineering, architecture, to engage with society and wherever possible the local environment around them and contribute through meaningful and sustained action. COLAGE will enable the institution to move beyond credits, tokenism and merely meeting learning objectives, to results-oriented action, along with meeting learning outcomes set for students. It will support institutions to design field-based learning-in-action programs where students can engage directly on the field, with local communities and work on real issues that exist in the community and the environment. The basic foundation will be transformational leadership, building agency in themselves and as a result in the communities they work with. The program will be based on experiential learning where students connect with issues on the ground, embodying values of empathy, dignity, equality and justice, build relationships with communities, deepen their systemic understanding of the issues, use their skills and competencies to co-create and arrive at workable and sustainable solutions along with the stakeholders in the community. This paper provides the framework and approach towards meeting the above objectives and synergistically contributing towards UNESCO's Education for Sustainable Development (ESD) agenda. The approach is based on simple yet sophisticated tools that are designed to be easily integrated into existing curricula of any educational institutions. It will also highlight possibilities, derived from experiences, based on a case study conducted along with a higher educational institution of architecture in South India.

Keywords: Agency, Learning-in-Action, Higher Education, Sustainable Development, Transformational Leadership

THEME B - Media and Sustainability Education

B1

Mass Media: The Instrument Of Environmental Education

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ABSTRACT

Mass media play an important role in shaping public opinion and government policies. Many researchers have reported that a strong environmental awareness can only be created if the media give environmental issues due consideration in their publications. But, in developing countries like Nigeria, the media does not seem to be in a position to create environmental awareness, because journalists lack basic understanding of the environment and media coverage appears to be event based only. While attempts have been made by several researchers to examine different dimensions of the use mass media in environmental education, there are few comprehensive reviews, especially focused on the particular situation in Sub-Saharan Africa. Hence, this study is concerned with examining the role of mass media in creating awareness in Nigeria.

Key terms: Mass Media, Environmental Awareness, Sub-Saharan Africa

B2

Cycle & Fission Impact: Education & Empowerment for Sustainability

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The question is: should the impact for good be a one-time delightful solution or a chain of continuous prosperity? We are aware of the fact that it is high time that we left our shutters open for the reality and shut them down for the denials. The reality is: we need to change our attitude towards conserving motherly-figure nature, and fatherly-figure sustainability. And as logical it sounds and as it is, a person's thought is generated with the help of knowledge or information shared with him or her, which further triggers the development of an attitude and personality that consequently leads to decisiveness. If we cut the careless and lenient attitude towards the conservation of nature (backed by proper knowledge and tools), then we can create many reasons for a better future throughout the future, including even the kind of future that starts next second you finish reading the last alphabet of this paper. A tight grip on the root cause of this problem and an effort at the Ground Zero is what we need now. The way forward to this is to utilize and promote the clubbed power of education and empowerment. This paper explores the possibilities of viable solutions at 4 different levels:

i) Pre-Schools
ii) Primary and Secondary Schools
iii) Women, and
iv) Media

Dimension 1: Pre-Schoolers

The first five years of a child's life play a key role in building the foundation for his or her future development, providing a sturdy base for lifetime learning and learning abilities, including cognitive and social development. Building relations with parents and educational professionals isn't just enough. Children must learn the values of connecting with nature and building a strong relationship with it. Pre-schools follow a different method and syllabus to teach students. However, tweaking it the green and sustainable way is much needed.

Tweaking Syllabus For Pre-School – Sustainable Way

The learning should be much more than just the crafts of recycling and reuse. It should pitch on responsible behaviour towards nature; encouraging the art of co-existence (flora-fauna-human); and daily habits among others. "The Pampered Earth" scheme is the way out.

The Pampered Earth (TPE) is a syllabus booster or a top-up that can be implemented in the pre-schools as a part of their daily study routines that works on the simple concept of pampering our planet Earth. And, the learning in this part should utilize the four major tools among others: Audio, Video, Activities and Nature-Participation with strategic and supervised learning. The following points need to focused at, while doing so:

- Getting children close to nature
- Disaster preparedness
- Imbibing the essence of sustainability and the sense of implementing it

Dimension 2: Primary and Secondary Education

The TPE scheme of study can further take up a larger role in the institutions that provide primary and higher education. However, here, the rate of teacher-student-parent participation has be on equal levels. Students being older than the preschoolers serve as an advantage for the implementation of the scheme rigorously. The targets should be on the following:

- Syllabus
- Visits, Workshops and Activities
- Innovations and Leadership (I&L)
- Faculty Training Sessions (FTS)
- Orientation of the parents

Dimension 3: Women

According to a study, 83% of single mothers were unable to return home after Hurricane Katrina for two years. Additionally, a lot of women die during climate havoc as they wait to rescue their loved ones and also due to their movement-restricting-narrow-scope-of-escape attires, like saree & Ghaghara. Studies conducted by UN reveal that 80% of people displaced due to climate change are women that results in: Diseases & lacking access to healthcare; Paucity of resources; School dropouts & early marriage; Increased burden of caring for young, sick and elderly; and Sexual violence and trauma, and others. Further, it exacerbates the cycle of poverty. An in-depth understanding of the context on national dimension, emphasis should be laid on the scope & importance of education of women, especially, regarding climate crisis management (in two categories: rural-urban, and pregnant-new mothers), which may include some of the common topics:

- General Education (Science, Maths, and Earth Science)
- Disaster preparedness, training on first aid, health & hygiene
- Balancing Emotional Quotient
- Adapting eco-friendly ways of living and daily habits
- Converting sustainable practices in to revenue models
- Breaking Stereotypes: Right to be among the decision-makers

All of this along with other pointers will be entailed in the HEC (Holistic Education Cell). HEC is an independent body that performs its activities towards attaining the goal of sustainable education through a small or large team, but with less or no dependency on the Government. It can operate unitedly as a single body or as a community.

Dimension 4: Media (Greened Media)

The critical part of our goal: generating awareness can be dealt with, with the help of media. Media's accountability can be met by bringing in action "Greened Media" with the tag line *rang de hara* (green it). And the following pointers have to be darted upon:

- Responsible developmental journalism
- Vernacular mediums
- Branding and promotions of the schemes
- Preference to be given to the research papers and articles

- Preference to be given to the businesses working in the segment if sustainability

The final paper would further discuss the plan and functionalities of the TPE, HEC, I&L, FTS, and GM schemes, and Orientation programmes. These programmes are unique in their own way of operations, but they share a common goal and common essences of: being viable; being able to exist and operate independently or with least dependence; and of being economical. The idea is to create a lasting and positive impact in a fission-reaction manner. Sustainability is not about just attaining it, we must sustain it.

B3

Am I A Dustbin?

CASE STUDY OF A CAMPAIGN DONE TO CREATE AWARENESS ABOUT SINGLE USE PLASTIC, CREATIVELY!

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'AM I A DUSTBIN?' - this was the question asked to the citizens of a city which generates approximately 2000 tons of solid waste daily, 20 – 25 tons of which being plastic.
This question was asked with the help of a typographically designed, 40 meters long and 15 to 20 ft wide float made out of plastic bottles and was floated in the river which is heart of the city, for 6 – 8 hours.
The city is Surat and the river, Tapi.

CLIMATE ACTION FOR A CITY LIKE SURAT

Among the many factors contributing towards climate change, constantly increasing use of 'single use plastic', its inappropriate disposal, lack of attitude and infrastructure for recycling, inappropriate waste segregation at the first point etc are all operating simultaneously and synergistically. Such issues become graver in a city like Surat.

Surat, located on the west-coast of India, on the banks of the river Tapi, is considered to be one of the fastest growing cities. It is home to some major industries like textiles and diamonds along with an industrial belt of Hazira where many national and international industries are located. This makes it evident that Surat has major migration, with its resultant impact - significant waste generation being one of them. Considering this scenario, it was felt that this issue must be handled, in an effective way.

SPIRIT OF VOLUNTEERING AND CCN

'Climate Conscious Network' (CCN) is an informal group of people passionate to work for climate change issues. The group stated with handful of people, has grew to around 40 to 50 volunteers, consisting of people from different walks of life - medicine, fine-arts, engineering, architecture etc. We have been carrying out activities like climate literacy to children and other groups of people in informal settings, water and energy audits of various schools of the city and other community work.
We started cleaning up activities in and around the waterbodies of Surat, which includes banks of the river Tapi, Dumas beach, few lakes located within the city, canals, etc. During the initial days only, we found plastic items in a large number. All throughout the process, creating awareness among the people was somewhere in our minds, but in a way that will enter to the hearts of the people, through eyes.

IMPORTANCE OF CREATIVE COMMUNICATION AND CELEBRATION OF EARTH DAY

The volunteers started the clean-up drive in the month of February 2019, on every weekend. At the end of three months we could collect a huge number of plastic bottles, in addition to other plastic. Since the Earth Day was approaching, we thought that to be the right time for effectively showcasing our activity.

After brainstorming, we unanimously agreed to make a huge but meaningful display out of these bottles. The members from fine-arts (Studio Untitled) came up with a typographically designed model using these bottles in the form of a question being asked to the citizens of Surat city.
The river Tapi is an ancient river flowing right through the middle of the city, on both the sides of which the city has flourished and achieved its current magnificence. Thus, the river is not only in the heart of the city but also in the heart of the Surtis. So, the river was THE right medium through which this question could to be raised.
Official permission form the Surat city Police, Traffic Police, Irrigation department and department of fire and safety was obtained before embarking on the endeavour.

Considering the Lok Sabha elections in Surat which was on 23rd April, we shifted our event one week after, on 28th April 2019.
The alphabets for the float were created separately and were carried to the site for final installation. After connecting them with each other in the form of 'AM I A DUSTBIN?', it was made to float on the water with the help of four boats which also worked as anchors for the whole float.
After 6-8 hours, the whole float was taken out form the river with utmost care and was given to a recycling agency.

REACH OF THE CAMPAIGN

Prior buzz was created about the event through social media. Even during the ongoing clean – up drive, people were being made aware about the campaign. On the day of the event, approximately 1500 to 2000 people witnessed the creation. Those who came at the site were informed about the demon of plastic pollution by the volunteers through an information booklet we made, in which some handy solutions were shared about how one can minimize the use plastic in their day-to-day life.

The campaign was very well received by all kinds of media, including social media as well as mainstream media.

B4

The role of social media and digital platforms in promoting sustainability initiative of corporations and brands – A qualitative study

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The age of social media has had a profound impact on the way people perceive the world and understand relationships. Social media has transformed into a tool that enables corporations and brands to effectively understand customer needs and also cater to their audience directly. This bridge in communication has opened new avenues of relationship management for companies and have also helped them reach out to their audience regarding their social responsibility and initiatives. Modern brands go beyond just showcasing their social objectives to now involving the audience in achieving them. Companies now are sensitized about the impacts of development and the need for sustainability as the objective of the said development. Conscious consumerism, those change agents who consider the social, environmental and political impact of their consumption, have propelled the idea of brands accountability for sustainability into the mainstream culture. Companies have now evolved in such a way as to using this conscious consumption and social awareness as a strategy to attract new customers or sections of audience on social media to engage with their products or services. Social media is no longer just seen as a mode of communication or as an innovative approach to business, rather social media engagement of brands is seen as a mandatory method of communication and a tool to build goodwill among a large pool of audience. Brands have created dedicated social media accounts to communicate their sustainability initiatives to its audience and this research will study the same as one of the key components. The variety of social media, I.e., Instagram specified to pictures, YouTube specified to videos and as such, have posed a challenge to these brand initiatives to constantly innovate and adapt. This research study will also focus on the effective means of communication in each medium of digital socialization and the brands that have successfully used these media to promote and propagate their sustainability initiatives. The inferences of this research are based on the qualitative analysis done upon these companies that have used sustainability communication as a catalyst towards achieving their social responsibility goals. The scope and purpose of this study is to analyze the effective mode of sustainability communication used by brands on
social media and to observe the trends of sustainability initiatives across different social platforms. The study will help companies and brands to enrich their customer relationships on social media using sustainability as a tool and means to achieving their organizational goal.

THEME C - SUSTAINABILITY EDUCATION IN NON-FORMAL SYSTEM AND EXTRACURRICULAR ACTIVITIES

C1

The effect of Non-formal Education Learning Activities on Promoting Education for Sustainable Development (ESD): The Case of Kyoyama ESD Environment Project.

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ABSTRACT

The concepts of Education for Sustainable Development (ESD) has been central to the global discourse on education recently. The role of learning activities on promoting ESD has been an issue of substantial growing scientific consensus. Although the focus of current learning activities studies has primarily been on grounding the value of formal education activities, fewer studies investigated the benefits of non-formal education learning activities (NFELA). Moreover, it is essential to explore how NFELA impact the promotion of ESD.

In Japan, Kominkans or Community Learning Centres (CLC) are social education facilities that has been established after World War II to provide community-based learning, which promotes social development. Furthermore, Okayama city in Japan has been famous for its contributions to the promoting of ESD, particularly, Kyoyama Kominkan in Okayama city is also known for ESD and environmental activities which are carried out through the Okayama Kyoyama ESD Environment Project (KEEP).

The current study examined the effectiveness of NFELA, it followed the qualitative research approach to provide a critical analysis on the partnership between school and Kominkan, as the previous studies up to now have been descriptive in nature. Interviews with Kyoyama Kominkan members and the director of the ESD promotion council of the Kyoyama district of Okayama city were conducted. Interviewees were asked various questions about the impact of NFELA, and KEEP.

The analysis of the interviews revealed a significant impact of formal and non-formal education cooperative learning activities for promoting ESD. Policymakers might consider devoting additional attention to the NFELA to promote ESD in their communities.

Keywords

Non-formal Education Learning Activities (NFELA), Education for Sustainable Development (ESD), Kominkans or Community Learning Centres (CLC), School and CLC Partnership.

C2

Bioenzyme: A program to promote use of natural cleaner through educational institutes

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Introduction

In traditional times, our grandmothers cleaned their homes with items that were easily available in homes. The convenience of modern lifestyle has ensured that nowadays, most items, required for home maintenance are easily available in the shelves of supermarkets. This however comes at a cost to the health and environment. An average household today contains around 62 toxic chemicals that have been linked to asthma, cancer, reproductive disorders and more. These chemicals not just harm our skin, but also enter our water bodies, polluting lakes and rivers. In 2018, Bellandur Lake in Bangalore spewed white foam and turned on fire because of the chemicals found in our chemical cleaners. It is hence very important that we prevent such chemicals from going into our water bodies. One of the ways to do that is to completely eliminate all chemicals from our households and replace them with a natural substitute.

Method:

NGO Rnisarg Foundation works in the area of waste management and aims at creating sustainable solutions for a healthy planet. Rnisarg has been promoting earth friendly choices among the citizens and one such product is bioenzyme. Bioenzyme is a natural cleaner prepared by fermenting citrus peels, jaggery and water, together to produce a mixture of concentrated acetic acid and alcohol.

The liquid is known to act as a disinfectant, and can be used as substitute for cleaning and degreasing surfaces like floor, kitchen stoves and chimneys.

Students from Smt. Sulochanadevi Singhania School are spearheading the initiative of replacing chemical cleaners used in school for natural cleaners. The school housekeeping staffs are trained to prepare and use it for floor cleaning in the school premises. For the purpose of ensuring a regular supply of raw material, the NGO has provided the school a tie up with a neighbourhood juice kiosk.

To further create a need in the community, the NGO also conducts regular workshops in educational institutes and local communities to promote usage among students and their families.

Results:

The program aims to achieve following objectives:

- The adoption of bioenzyme for school self-consumption ensures economic and environmental savings
- Engage students to promote awareness about the ill effects of chemical cleaners and promote choices that are cleaner and healthier to oneself and the environment.
- The mass production at school also ensures that school can sell the product beyond self-consumption and provide additional source of income to the housekeeping staff.
- The prepared bioenzyme is packaged in old plastic containers, to avoid usage of virgin plastics.

Conclusion:

Promoting such initiatives through schools can enable educational institutes to become a one-stop shop for learning and promoting people adopt a sustainable lifestyle.

Keywords: Natural cleaner, chemicals, sustainable

C3

"Tetra Traps Timbre"

Constructive Reuse Of Tetra Pak Cartons

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To minimise the acoustics of the room the Tetra Pak cartons are fixed to form an irregular surface. Sawdust(environmental menace) fortified with neem leaves is used to pack the Tetra Pak cartons after washing and drying. Sawdust with its cellulosic quality is known to be a natural sound absorbent. It has maximum air gaps and air being a sound insulator has a synergetic effect. Dried neem leaves; a natural insecticide prevents infestation of termites in the sawdust and prove an excellent packing material. Old blankets are used as curtains for windows and flooring. Walls and roof is to be covered with the above mentioned materials. At the outset, using the software 'REAPER DAW', the echo of sound within the room and the noise level emitting to the outside is measured and noted to monitor the difference in sound level. Constructs formulated, blue print executed and the model reconstructed witnesses decreased sound levels.

Accolades received

1. One of the top 5 projects shortlisted for the 'Go South' Contest.
2.One amongst the 111 projects selected , out of 2500 projects from across India,to be showcased at the IRIS-Initiative for Research and Innovation in Science National Fair -2012 which was held at BalBhavan,NewDelhi.Our project won lot of appreciation and was conferred a "Special Award" for Environment Management by Mr. **Hem Pande,** *Joint Secretary* **Ministry of Environment** *&* **Forests***.*
***3.NGOSwechha India has chosen this project** for Environmental Fellowship which is awarded to our student who is working with a group of economically weaker students , as a Socio-economic-environmental entrepreneurship, to sound proof printing cum photocopy room of our* school.

C5

"Destination 2030 – Let's change our world through SDGs": inspiring the youth toward a sustainable future

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MUSE-Science Museum of Trento has recently implemented communication and education actions on SDGs for general public, students and teachers [Ballatore and Tombolato, 2017; Ballatore and Rusci, 2018; Ballatore and Eriksson, 2018]. Worldwide attempts in communication of the UN Agenda 2030 also involve Science Centers and Science Museums, as stated by the Tokyo Protocol [SCWS, 2017]: in Italy MUSE-Science Museum is working hard on this theme. In 2017 the museum launched the Project TASK (Toward A Sustainable Know-how, entirely focused on SDGs' communication and education) and became member of ASviS (Italian Alliance for Sustainable Development).

The contribute will presents a case study concerning the workshop "Destination 2030 – Let's change our world through SDGs", designed to inspire debate and reflections about our sustainable future among the youth, within the framework of the UN Agenda 2030. I based the activity design on two pillars: 1) the integrated nature of the 2030 Agenda and the interconnections among the SDGs [ICSU, 2017; Weitz et al., 2018]; 2) the System Thinking approach to describe, understand and maybe even rule our complex world in a sustainable prospective [Hjorth and Bagheri, 2006; Bagheri and Hjorth, 2007]. These are both coherent aspects, driven by the need of making the youth aware of the existence of complex systems and master their dynamics. System Thinking is a new and useful conceptual tool used to discern processes and learn how to deal with the ambitious challenges of the future and sustainable development. System Thinking allows us to understand the whole picture while seeking relations and dependencies inside it, in order to explain its complexity [Cavana and Maani, 2000].

The workshop is designed for students from 11 years old (middle and high school). The contribute will presents a detailed description of the workshop and the designing process (activity, environment, facilitation, goals), moreover the workshop has been successfully carried out in two festivals and the research outcomes will be reported too.

"Destination 2030" has been proposed during the Science Festival of Genova (25/10-04/11/2018) and during the "SDGs' week" occurred in MUSE-Science Museum of Trento (19-22/02/2019): these events involved more than 700 people participating the workshop and represented the opportunity for collecting data. A specific evaluation process has been planned in order to assess the impact of the activity trough the feedback of teachers and students. Therefore, the results provide useful elements in supporting the discussion on such informal educational actions, which could lead to further development and dissemination. How students and teachers approach the future? How do they feel engaged with the SDGs? Can informal education provoke change in the youth? Which aspects of the activity design (gamification, teamwork, collective reflections…) are more effective?

These days science education has to be transformative, the main goal should be provoking reflections, dialogue and debates, active participation and raise awareness. We should speak about sustainability without catastrophism or alarmism, keeping the focus on future and change. The workshop "Destination 2030" is an attempt to change how we communicate and educate on sustainability, in order to be more effective for the target audience.

The activity and associated research is part of the project TASK (Toward A Sustainable Know-how) and has been supported by the Autonomous Province of Trento through the fund "I comunicatori STAR della scienza" (2017-2020).

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Key words: SDGs, ESD (education for sustainable development), science museum, youth, future

C6

An Integrated Model for Environment and Sustainability Education for Adolescents in Urban Poor Neighbourhood, Surat, India

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Sustainable education needs informal community learning mechanisms. Integrating sustainable environment education with the primary and essential life priorities of urban poor population is crucial. If development practitioners and educators simply bombard their own agenda of "Environment Education", the model is less likely to be accepted by community.

To enhance acceptance, a two fold approach is essential:

1. Understanding felt needs of the community and actions to improve their lives
2. Progressively developing creative mechanisms for sustainable learning

In this context, SAHAS and its city partners are primarily working with 820 adolescents from 9 slum areas of Surat city, Gujarat to build a community sensitized to sustainable education, nurturing and adopting pro-environment behaviors.

For achieving this aim, 4 innovative and context specific models were piloted during 2018-2019.

As a prerequisite for the acceptance of sustainable education, the 4 models were integrated with the on-going community development programs of the organisation on health services, promotion of primary and secondary level education and prevention of school drop outs in the local government schools and facilitating livelihood education among young people in the slums.

1. Festivals and community gatherings as opportunities for sustainable education:

These provided unique platforms for learning about environment and sustainability. A case in point is the traditional " Ganesha festival" which is celebrated with great fanfare by the adolescents in the slums. Little thought goes into the harm done to water bodies during immersion of the idols which are normally made of polluting materials. A mapping of trees in two of the slums led the adolescents to realize the lack of trees in the neighbourhood and how critical their presence was to provide clean environment. The insights geared them to think beyond traditional and culturally practiced norms. As symbolic but more sustainable solutions, the adolescents decorated a tree in their slum as 'Ganesha" or used mud to make their own idols. They decided no immersion was required in the case of the "tree Ganesha" – it should live and be with them through the year and forever . The mud idols were immersed in a bucket of water at the end of the festival.

2. Life Skills Education for Environment (In-school programme)

The programme on "Life Skills Education" was piloted by teachers specially trained for it and targeted 227 students of 7th class in 5 government schools. Innovative approaches to impart environment and sustainability education entailed the incorporation of essential life skills such as critical thinking, decision making, problem solving and communication during teaching of the syllabus on subjects such as Science and Social science. Classroom teaching was supplemented with other creative activities such as drawing competitions where students expressed their knowledge and concerns about environmental issues.

3. Opportunities for out- of- school adolescents

Another vulnerable but potential group identified in the neighbourhoods was out- of –school adolescents, usually more difficult to reach . We used non formal settings such as camps and computer center to engage with such adolescents. 95 children attended a summer camp in which creative activities on sustainable education such as making "best use of waste materials" were incorporated with other recreational activities. Volunteers working for climate action in the city helped to build the larger perspective on environment and sustainability.

4. Adolescents as active citizens

The ultimate role of education for sustainability among children is that they develop into active and conscientious citizens. For children living in slum conditions the challenges are deplorable. Empowerment of the adolescents facilitated their engagement in neighbourhood cleanliness drives and for alerting the local corporators for health, safety and environment related issues. An adolescent led, household level waste segregation and plastic recycling pilot model is in place.

Further more, collaborations with our partners in the city facilitated participation of the children across the city in a unique process for preparing and presenting a " Children's Charter of Demands" to the administrators. The concerns and needs of the children may vary depending on their socio economic status but what was common to all children was a vision of a clean , green and a sustainable city.

Cities need to prepare themselves for creative, multi-stakeholder and integrated models for environment education which are rooted in life experiences of young people.

Keywords – Adolescents, Integrated Model, Environment Education, Life Skills, Surat city

C7

An Exploratory Study Examining Gender-Sensitivity within Environmental Education to Minimize Gender Differences: Potential Impacts for Sustainable Development

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Abstract

The United Nations, because of the growing concern for international development issues, fashioned the 2030 Agenda for Sustainable Development. This agenda promotes 17 fundamental objectives, known as the Sustainable Development Goals (SDGs). These goals are essential in order to achieve and secure a sustainable, peaceful, prosperous, and equitable life on earth for all, now and in the future. According to UNESCO's understanding of Education for Sustainable Development (ESD) there are three crucial pillars of sustainable development (SD): economic, environment, and social. Education, in all three pillars, should be tailored to motivate people to change their behaviors, take action, and promote better-educated decision making. When considering the SDGs, gender-sensitivity within education can encourage and empower the participation of all citizens, particularly women and girls, to make sure they have voices and opportunities to participate in any public sphere.

With EE being vital to the environmental pillar of ESD, this research examines gender-sensitivity within Environmental Education (EE). In present-day societies, the voices of women and girls are often not taken into account. However, research shows women are often more concerned about environmental issues than men and are more likely to take action against environmental destruction. The objective of this research is to understand the potential impacts that gender-sensitivity within EE can have for better SD. By using the framework of SDGs 4: Quality Education and SDG 5: Gender Equality, educators and researchers may be able to find ways to minimize gender differences to enact better overall SD. We start this study with a comprehensive introduction of the terms and definitions used in gender studies in order to review the theoretical literature associated with gender-sensitivity issues within EE. Next, we link gender theories with education development theories to discuss approaches that educators and researchers can take to increase EE's gender-sensitivity. Furthermore, we discuss how gender-sensitive EE programs can positively impact students' practices and behaviors.

Our study found that when researchers and educators use the framework provided by SDG 4 and 5 in their curriculum and research design, they can create the potential to help future generations. By further minimize gender differences in EE, the global society will be able to better implement overall sustainable development throughout the world. By fostering gender-sensitivity and gender-awareness in EE and ESD curriculum and research design, researchers and educators can enact EE and ESD activities and programs from a more gender-sensitive approach. This may ultimately help to empower women and men to equally act in environmentally positive ways. We will complete our poster by presenting the future implications on ESD if educators and researchers start to promote the value of gender-sensitivity in EE.

Keywords: Environmental Education, Sustainable Development, Gender-Sensitivity, ESD, SDGs

C8

Vayam: A case study on community education for sustainability

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Abstract

Vayam is a twelve year old movement for making leaders at roots for democracy and environment. Our focus area includes tribal villages of Northern Western Ghats. We define education as a change in behaviour in response to what is happening in the surroundings. Unfortunately, current education system prepares our children to detach from the environment. The problem is highlighted when it comes to tribal areas as our education system is not designed to deal with diversity. Therefore, we have developed a locally appropriate model of integrated community education for sustainability so that the community can conserve and wisely manage resources as ownership brings responsibility. Vayam has therefore been focusing on a three step approach i.e. awareness, empowerment and conservation.

Awareness: Leadership camps are conducted through which awareness is created about democratic rights. The villagers are trained to identify local problems and come up with locally appropriate and practically implementable solutions. Children are exposed to environment by educating beyond books where they can develop their own understanding of their surroundings and groom themselves as young leaders. Youth is connected with science to develop barefoot engineers.

Empowerment: Empowering villagers along with women to actively participate in local governance. Alongside, the community is also trained to understand and use the laws which in turn lead to self governance and sustainable development. This in turn leads to strengthening democracy at roots

Conservation: Conserving natural resources i.e. water and forest has been possible through community participation. As an outcome of awareness and empowerment the villagers have now come up with People's Biodiversity Register, 180 hectares of community protected forest, better water management practices.

The paper puts light on the Vayam's approach and time tested initiatives in 150 villages. The model is being appreciated and replicated in other sections of the country.

Key words: Community education, awareness, empowerment, conservation

C9

Education for Sustainable Development: Non-formal environmental education in Higher Education Institutes

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ABSTRACT

Since Environmental Education became mandatory in formal education systems in India, in the case of higher education institutions, it still largely remains a peripheral subject. Although some colleges have a foundation level course, it is very difficult to determine the impact it has on the students in terms of their learning outcomes such as critical thinking, active citizenship etc. Environmental education has a large scope for adopting non-formal ways of promoting sustainability in higher education institutions. They can help the students make linkages of their subject areas with local and global sustainability concerns. These also enable them to develop problem solving and critical thinking skills, and use their professional knowledge and skills to make a difference in the environment. Non formal methodologies provide the opportunity for hands-on experiential learning to students through projects they undertake.

The case studies cover non formal programmes related to environmental sustainability and the benefits they have to offer the students in long term. These benefits are often overlooked as the objectives of non-formal activities often do not meet with the criteria set in the curriculum. The concept of sustainability becomes obsolete in some of the cases where the curriculum is too intense and schedule is too tight. However, with the right approach, it is possible to impart sustainability education in higher education institutes through a non-formal pedagogy. Although this requires active participation from students, it is also the responsibility of the college management to empower and encourage activities and initiatives which lead to development of students' critical thinking towards sustainability. The following case study of 3 colleges serve as an example of initiatives taken by the college students as well as management to adopt the importance of environment in day to day life and type of initiatives that can be taken to make a green campus.

Action for Green Campus
Handprint Fests (M.S. University)
My Campus, My Responsibility (SVCE Chennai)
Community Impact (GLS Law College)

Handprint Fests

Annual fests are an integral part of college life and help bring together students from various departments to celebrate the culture and ethos of the institute, to celebrate the achievements throughout the year and to give impetus to the activities – both curricular and extra-curricular for the next year. Being an important part of college life, these fests also draw a huge number of students as participants each year – both from the institute and outside – and this brings with it a lot of challenges in terms of campus waste management and other sustainability aspects of the college campus. To solve this problem and to ensure sustainability of campus, during and after the annual fests,a set of guidelines, roles and responsibilities have been developed by the South Asia Youth Environment Network (SAYEN) and Centre for Environment Education (CEE) in the form of a module for Sustainable college fests. Colleges sign up with SAYEN and follow the guidelines during their college fests.

My Campus, My Responsibility

The "Greening Universities" is a global initiative by UN Environment to create a network of universities across the world where students are completely aware about the resources which they consume from their institute/university and how the students can do to make the campus sustainable and eco-friendly.CEE has developed a Handprint Campus initiative drawing from UN Environment's initiative on Green Universities. The Handprint Campus engages the students and the management in developing an Action Plan focusing on sustainability indicators that the college would achieve.

Community Impact

Education for sustainable development has long term effects. Firstly, the methodology learnt through different activities and initiatives is helpful in developing criitical thinking towards the environment and other aspects of sustainability. The real life examples and opportunities to implement theoretical concepts give students a sense of responsibility and ownership of natural and acquired resources. Strong ties to cultural and natural heritage of the area also trigger the youth in taking action to conserve and maintain the natural and economic importance of various places.

Keywords – campus, sustainability, education

C10

Spirituality as a tool against climate change

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Abstract

Spirituality has been an important element of bringing the individuals of a particular group together. The swelling degradation of the climate is a serious concern to be dealt with where humans have considered themselves to be the masters of the creations rather than being the protectors. The mortified state of climate caused by the humans has raised an opportunity for spirituality for acting against the climate change and screen the environment from the malicious human activities. The spiritual leaders can play a great role in articulating how the world, humans have created a reflection of their inner self. The message that humans have to live up to is the onus of the God's masterpiece where Water is our Father, Air our teacher and the sacred Earth, our mother. A connection can be built between "Dharma" and climate change where our Dharma is to serve for the planet where the river is contemplated as goddess and the mountains our gods. Spirituality can be a viaduct for the journey of guiding people towards the incalculable efforts of ameliorating climate conditions backed by the heritage of the belief, the collective compassion, acumen and the leadership of humanity. Rise of 'Spiritual Gurus' in India exerting political influence can be easily moulded towards policy changes facilitating green energy and climate change awareness. The survey conducted depicts that most of the respondents who follow a specific sect/guru are ready to bring a change in their lifestyle to combat climate change if their sect/guru asks them to do so. although , when it comes down to spending money on a green initiative the number of positive responses drop down a bit though still being in majority. They can serve as a catalyst to the process of promoting sustainable development. We are witnessing some amateurish conduct from the followers of some self proclaimed religious gurus these days which can be easily transformed and utilised in a productive and progressive way provided that they are exposed to true values and essence of religion.

C11

Sustainability Education In Non-Formal System And Extracurricular Activities, Good Practices/ Case Studies

BEYOND THE CLASSROOM

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Sustainability is the focus today, in every sphere be it city planning, growth, design or just our lifestyle. Sustainability also, is not just for the environment but also important in the social and economic setting. It requires a certain amount of sensitivity in the people, to forge ahead towards the goal of sustainability. Sustainability has to be in the day to day. Sensitizing the youth about the current situation and the way forward is key to help catalyse the change.
Today, there is a virtual world around so exciting and entertaining that the real one can sometimes be forgotten. India has inherently been a conscious nation, and it reflects in the culture that got shaped around us. Care for the environment and the people around us reflect evidently in most of the value-systems passed on to us. Somewhere in the midst of globalization, development and the virtual world that we are creating, we have forgotten the care part of it.
In this chaotic world, how do you spread the message, how do you hold meaningful conversations, that reflect on the above situation. Play is something that can be an amazing medium to teach, be it about being conscious towards the environment, understanding the very essence of human behaviour and the society or about the qualities you want to imbibe in them. It's a fun, effective medium of learning.

With this in mind a program has been developed with exercises and activities that revolve around key aspects of resource management, the environment around us, empathy and equity, etc. The idea is to help the students raise pertinent questions, deliberate on their opinions and create a platform to learn through experiences and the patterns that emerge through play. This helps generate an awareness and get sensitized to the situations around them by analysing behaviour in a fun filled manner. Teaching through play can break the barrier and encourage open discussions and help the students ideate ways to do their small bit for the world.

Keywords: Play and learn , sustainable, sensitivity, environment, social sustainability.

C12

Building environment sensitive community by involvement in informal play groups

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Introduction:

Play is one of the main occupation through which children learn and engage in (Case-Smith, 2004). Not only do children benefit but adults too get better connected to others and to the world around them (Robinson et al, 2019). A small group with the aim of forming friendship, stronger community was started for neighborhood children and their parents on a Friday evening for 1 hour in residential space of the author.

Method:

Children and their parents were invited and facilitated by the author to engage in informal play, yoga, games, and community activities, story listening and environmental initiatives. Parents although initially not interested were also mindfully involved during festivals and community initiatives by assessing their strengths and accordingly assigning them a responsibility each. Children got further motivated by seeing their parents involved and gave the group a stronger sense of community and strength to do more environment protection related work. The group ran weekly for almost 2 years and now has shaped to take on a more specific role of environment sensitisation and protection role after the initial period of running as a general group. At present focused activities during the school holidays and based on need (e.g. litter picking, visiting a forest, learning about segregation/composting etc.) are organized on a regular basis.

Outcome/Results:

Stronger sense of community, friendships and ownership was built both among children and adults. Behaviour change for sustainability was possible by first building friendships, involvement and knowledge sharing within neighbouring community. A Facebook page (Healing Environment) on sharing good practices as a result has been started. A whatsapp group to communicate about environment events is also in place to keep the members informed. Two other members apart from author have started composting wet waste at their homes and many others are inspired to make small changes. The initiative was an example of how in an informal way with very less resources and no monetary transactions involved we can keep working for sustainability and environment protection at a community level and keep two generations involved.

Key Words- Informal Group, Play, Community

C13

Swachhagraha Easy Tap

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The Global Threat Of Water Scarcity is clutching its hold around the planet. In this tense situation, every drop of water is important for existence of humankind. And to make it happen, each individual's lifestyle is needed to be the most efficient possible. However, still the seriousness of this issue is not visible in majority of inhabitants. Focusing on a small yet important action of water usage of various situations in academic level, I have observed that normally, students after using toilet do not wash their hands properly. Due to the lack of knowledge of washing hands, amount of water required and in impatience, they waste lots of water. In addition, as per UN Report, an average hand wash needs 650 ml (1 & Half Mug of water) but in reality, students use more than 5 mugs of water in hand washing thereby wasting large amount of water. More than 1,50,000 schools does not have proper hand washing facility. Moreover, the students who has the privilege of this facility on using it after using toilet transfers the fecal contamination to the tap that spreads to other students using afterwards and thereby causing severe diseases like Diarrhea Hepatitis-B etc. Keeping all these factors in mind, I came up with the Innovative idea of **Swachhagraha Easy Tap.** It is an easily installable lever mechanism based hand washing station made completely out of waste materials.Water is filled in the container mounted at the centre is connected with a wooden piece whose lower portion is on ground with the help of rope that on pressing tilts the container and water starts coming out of hole made in the container through a small pipe. The rechargement of used water into the underground water table through soak pit with proper purification is the finishing line of my Innovation serving gratitude to our motherland for letting us use it. Use of limited amount of water for efficient hand washing, waste materials as foundation elements, zero contact of source & user, cost effectiveness & portability are the special features of this innovation, which is making students & every other individual of the society to receive Environment Education, achieving the goal of Clean Water & Sanitation (Goal-6) & making participation in the fight against Climate Change.

C14

Clean Way Of Green Living

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ABSTRACT:

People act according to their convenience and most convenient way they figured to get rid of wastes is throwing it anywhere. This languishness of people had jeopardized the global ecological security. Due to misuse and mismanagement of polyethylene, it had proved to be an anathema for our mother earth. Prime subject of our project is to clean school and its surroundings from harmful plastic and polythene. In addition, prevent harm on nature by planting plants with the money collected by selling those collected plastic and polythene wastes. Under this project all of our efforts has been centered for renovating our way of living with green specs on by providing sustainable education to students & civilians to make them keep two separate waste bins for organic/kitchen wastes and inorganic/polyethylene wastes in home, separating polyethylene waste from other wastes at home. And, most importantly to awake and conceive students and people using deciphered methods like rallies, dramas, campaigning etc. for not to use PBs and plant trees. Now, for a proper pathway to sustainable destination, the organic waste left, after separation of inorganic, using kitchen garden concept is converted into manure at home itself. Moreover, we have sold & insisted them to sell the inorganic wastes in recycle mart and do plantation from money earned thereby creating assets for our healthy future.

The objective of providing sustainable assets of Environment education to students & civilians to act in favour of nature by using Wastebin method, shopping bags and kitchen garden concept of waste management has been fulfilled with my project & the large scale plantation done through this initiative has made us one step close in achieving Sustainable Development Goals and strengthening a response team for Climate Change with Climate Change Education

C15

Green & Sustainable Traffic Management System

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ABSTRACT:
This project is designed to regulate traffic chaos in front of my school building, which houses two separate schools; English Medium and Hindi Medium. During ten minutes gap from closure of English Medium and commencement of Hindi Medium Schools nearly 2450 students reading in Class VI to XII used to assemble in the main gate for exit/entry. At the same time the road is blocked due to congestion of students, autorickshaws, cycle-rickshaws, parents, and public traveling through the main road all this result in the creation of **"Chaos"**

Using the three different entrances of school building, we have designed a sustainable traffic system consisting of well -planned steps making the students park their vehicle in the area of entrance from the direction they come to school, making the auto rickshaw driver park their vehicle in the direction in which they have to move after picking up students & insisting the parents to park their vehicles on other side of the road. This altogether works collectively to keep the road free and wide open for everyone to move resulting in smooth transition of travellers without a single chaos & mismanagement. With this well-defined traffic regulation, chaos is eradicated through cooperation and awareness.

This system has made students much more disciplined, helped them to gain sustainable education regarding mobility & road safety, has secured everyone from chaos borne accidents & injuries and has brought a significant reduction in air pollution & noise pollution caused by vehicles due to chaos thereby serving as a master plan to fight against climate change with Quality Education.

C16

Equity Related Concerns: Impact of Private tutoring in India

(Working Paper)

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Private tutoring is one phenomena that has been an intrinsic part of the Indian system of education since 1980s. The structure of private tutoring is such that it mimics the regular school curriculum and modifies itself to match the needs of the school and the children. Any changes in the regular school curriculum, bring a change in its supplement as well. It thus behaves like a 'shadow' of the regular schools. Though private tutoring was believed to enhance learning opportunities of weak students it has now become a *'parity of prestige*' issue. In a country where the state is mandated to provide free and compulsory education to all children, the existence and expansion of private tutoring violates the Education for all Principles. On one hand where education can be used as an instrument to achieve equity and justice, the over emphasis on entrance examinations leads to mushrooming of the shadow education system. With the expansion of this shadow it has begun to deepen the inequalities already prevalent in the stratified schooling system and society at large. The SDG goal 4 of inclusive and equitable quality education to promote lifelong learning cannot be attained while our eyes are closed to the highly unjust private tutoring system. Keeping this context of Indian society, the paper attempts to explore the impact private tutoring in light of the equity related concerns especially on the Indian society.

Methods: the paper has emerged from the M.Phil dissertation work of the scholar. It follows a qualitative research methodology with semi-structured interview schedule as the tool for data collection. The study compares higher secondary students perception belonging to the government and private schools; including students in the EWS category. Also, purposive sampling technique helps the researcher brings out variety of responses in terms of gender; socio-economic and cultural background; parents' education and occupation; subject stream opted by the student and academic achievement of students. Parents, students, teachers and tutors all were part of the data collection process.

Findings: The findings reveal that the students and parents in general are very anxious of the process of transition to university. In case of students studying in science stream the anxiety increases manifolds. The problem lies in the availability of stratified tutoring system depending on the fee paying capacity of households; just like the case of private schooling. The students suffer a multilicity of disadvantages when they are first generation learners, who are migrants and come from the lower socio-economic backgrounds. The additional help that students with greater economic capital posses further widen the gap these students face due to lack in social and cultural capital. With inequality being at the heart of private shadow education system, the policy gap makes it further devastating for families. The students coming from the fringes are the most affected and the possibility of success are reduced to nearly zero with intersectionality of disadvantages they face. The paper urges the administration first to recognise the shadow industry and then form policies that help make the education system equitable. In conclusion,

without taking the factors and activities moving alongside school education, equitable and inclusive quality education(SDG 4) is a far-fetched dream that cannot be achieved.

Keywords: *school education*; *private supplementary tutoring*; *shadow education*; *equitable access*; *comparative education*

C17

Consumer attitudes, awareness and willingness to pay for sustainable five star hotel restaurants in Northern India

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Abstract

Sustainability and conservation of the environment are two rising concerns in the world. the effects of degradation of environment can be seen through climate changes and the increasing landfills. Hotel industry has been claimed to have a part to play in the destruction and pollution of the environment. With the tourism initiatives being introduced in India, the pressure to provide accommodation and food will be on the Hotels. The environment is further expected to degrade if hotels continue to use non sustainable resources. The need in India is to implement sustainable practices in the Hotel industry. The role of Government and consumers also play an important part in determining whether the changes will be implemented by the Hotels in India. It was found through the literature in the study that the Hotels need to change to green practices in order to have a positive impact on economical, social and environmental factors. In terms of the economical factors, it was seen that the business would benefit from the green changes as there will be substantial reduction in the daily operations cost of Hotels. Further, hotels would be able to create a brand image and attract consumers. The social impacts would be seen on reduced impact on the locals of the harmful activities undertaken by the hotels in the form of releasing gases in the air through chimneys, waste disposal issues and water consumption pattern. The government needs a firm ground in implementing the existing schemes and policies along with better monitoring of Hotels on implementing the green practices. The consumers on the other hand need be aware of such practices and develop a positive attitude regarding green hotels. Awareness and attitude of consumers will impact their choice of staying in the green hotels even when they have to pay extra than the non sustainable hotels. The study therefore has focused on these three aspects i.e. consumer awareness, consumer attitude and their willingness to pay a premium to stay in green hotels, which impact the decision of the hotels in implementing green practices in the business in Northern India. The study aimed to explore the factors of consumer awareness, consumer attitude and willingness to pay premium that impact choice of sustainable 5 star hotelrestaurants of Northern India. Based on the study aim, a quantitative research was conducted using survey of 447customers or visitors of the chosen hotel-restaurants. The study used KMO factor analysis method to identify the most significant factors of consumer awareness, consumer attitude and willingness to pay premium that impact their choice of the sustainable 5 star hotelrestaurants of Northern India. The survey showed that 14 factors for consumer awareness, 16 factors for consumer attitude and 10 factors for willingness to pay premium were the most significant aspects that impact the choice of sustainable hotel-restaurants in India.

Keywords: *consumer attitude, consumer awareness, willingness to pay, hotel restaurants, sustainability*

C18

Promoting Scientific Temper for Sustainable Development

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Abstract

The United Nations decade of Education for Sustainable Development (2005-2014) highlighted the vital role of education in our pursuit towards sustainable development as defined by the Brundland Commission in 1987, i.e. ensuring that the needs of the present generation are met without compromising the ability of future generations to meet their needs and that environmental, societal and economic considerations are balanced as we aspire to achieve an improved quality of life. A global consultative process further led to the adoption of the 17 UN Sustainable Development Goals in 2015. Sustainable Development Goal 4 (SDG 4) identifies education as a key driver of sustainable development and advocates for 'inclusive and equitable quality education and promotion of lifelong learning opportunities for all'. SDGs also recognize that communities need to be actively involved in water, waste and energy management, ecosystem and biodiversity conservation and protection of air and soil quality to prevent climate change and achieve sustainability goals. This is possible only by creating a scientific temper in the society in general, and the younger generation in particular. Rational thinking is a must for finding solutions for our day to day problems and reaching to logical conclusion. This is also important for fostering creativity, innovations and progress of the nation. Science education for sustainability should include promotion of critical thinking, questioning, problem solving and decision-making skills. Science Centres and musea can play an important role in fostering sustainability by explaining complex scientific concepts in a simplified manner and by providing interactive learning opportunities to students and general public. Pushpa Gujral Science City offers several opportunities for education for sustainable development through live examples (like, energy park, biodiverse campus, rain water harvesting, bio-toilets etc.), interactive galleries (like Climate Change Theatre, panorama of life through the ages, health, biotechnology, fun science, virtual reality, bird & space galleries and dinosaur park, Simulators, Large Format Films, 3D shows, etc.), participatory programs (like, projects on Innovation, nature camps, etc.) and outreach activities (through mobile science exhibition which reaches out to rural schools and village population with interactive exhibits on water, sanitation, waste water treatment, safe food, health and nutrition, etc.). The present paper discusses the outcome of two important programs i.e. Mobile Science Exhibition and RISHI Innovation program which can serve as models for ESD. The study points out that young students are innovative and have the potential to solve societal problems. Questionnaire based analysis indicates significant impact of these programs in terms of scientific knowledge imparted to the students and public and that people learn more through observation and edutainment.

C19

Could conscientious commerce be a paradigm of sustainability education in business, economics and management?

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Introduction

Conscientious commerce, in its sum and substance, is commerce based on one's conscience rather than one's selfish intent. What the conscience is,where does it inhere and whether its awakening in the context of sustainability education in business economics and management (BEM) is possible are the issues this paper seeks to traverse. The paper draws its rationale from the fact that in popular perception, business, among government, business and civil society, appears to be the weakest bet for ensuring sustainable futures and realizing sustainable development goals (SDGs). The pertinent question here is whether this perception of business is attributable to the inherent, innate nature of business [more correctly business persons] or to the mainstream models of economics and business education? Being an educator, the author would tend to take the onus on the latter. We make a case for conscientious commerce- the commerce i.e. industry, trade, and other services- based on responses to one's conscience i.e. the inner voice as a probable paradigm of sustainability education in business, economics and management. It is both interesting and significant that since the last twenty years or so the word conscience that had gone into the oblivion since the classical / scientific management era, has been gaining currency (Figure-1).

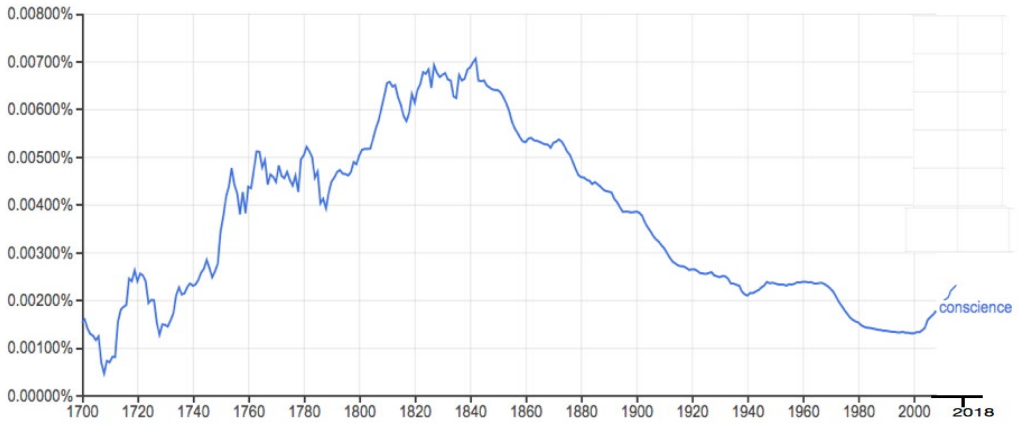

Figure-1: Sentiment Analysis of the Word 'Conscience'

It could not be a mere coincidence that the rising usage of conscience since 2000 as evident from the sentiment analysis in Figure-3 coincides with the adoption of Millennium Development Goals (MDGs) at United Nations Millennium Summit in 2000 and the adoption of the Sustainable Development Goals

(SDGs) by the United Nations General Assembly in 2015. We would not analyse the early history of the rise of the usage of the term albeit it is not difficult to envisage it given the predominance of religion and religious faith during that era. Whilst we may draw reference to religious interpretation of conscience, our approach is to emphasize its meaning and importance in the secular tradition. Likewise we would also not be examining its decline here for that would necessitate a deep dive into the evolution of the theory of firm and organizational and management thought. Some insights on this aspect, however, are available in one of our earlier works on the subject (Saxena, 2014). In the ensuing section, we examine the popular and widely prevalent paradigm of BEM and interrogate it as regards its efficacy in facilitating the attainment of the sustainability goals. In Section III we delve into the concept of conscience as a guide to one's thinking, decisions and actions. In the same section we develop the concept of commerce based on conscience i.e. the conscientious commerce. Section IV is devoted to the presentation and discussion of the select experiments with the idea of conscientious commerce in the setting of an undergraduate programme of a college of University of Delhi, India. In the final section we contemplate on the potential extension and integration of conscientious commerce into the BEM.

Profit/Wealth Maximization Paradigm

The paradigm of profit / wealth maximization is rooted in the non-zero probability of loss in any business or financial investment (Phan, Siegel, & Wright, 2016). It legitimizes the expectation of compensation for the cost ofcapital plus an indemnification against the risk of loss of unrecoverable investments in individual (or collective) effort, time, and social and political capital (Knight, 1921). Profit thus is regarded as the cost of being in and staying in business. It is the mechanism that keeps the productive apparatus going. At the one end the defenders of this paradigm do not define how much profit would be sufficient to sustain this mechanism; and, at the other they contend that the mechanisms that lead to the creation of wealth should not be confused with the mechanisms to distribute it. In the same vein, this paradigm seems to suggest that the institutions enabling pursuit of profit are and should not be the same as those constraining the choices the business make that create harm for others (Bradley & Klein, 2016).
The paradigm of profit / wealth maximization was further fuelled by neoliberalism, the 20th century reincarnation of the idea of *laissez faire.* It is but a historical fact that, within less than a decade of it going viral, neoliberalism started showing cracks. It crumbled in the wake of the economic crisis of 2008. The crisis expedited and provided further impetus the quest for alternative models of economic organization.

In fact, the economic and management thinkers and practitioners more so of late, have been contemplating on and developing alternative perspectives on economic and business thinking. In the author's view the development of and consensuses on the MDGs and SDGs manifest in a way the culmination of these alternative ideas. The mainstream business and economics education (BEM), however, seems to have lagged behind in according the due place to the alternative perspectives and social and planetary concerns in curriculum design, content development as well as classroom practices. Emphasis on mainstream here is noteworthy. For not only has this paradigm been questioned but also appeals and attempts have been made for developing reflexivity in BEM classrooms (Dyer & Hurd, 2016). Recently, we have also made a case for businesses as enactments of social, religious and cosmic harmony (Saxena & Jagota, 2019). The emphasis on mainstream is noteworthy also because the paradigm developed here is but an alternative in pursuance of sustainability education.

Conscience and Conscientious Commerce

Conscience

Conscience is an esoteric concept. Metaphorically it represents "inner voice" or "inner vision" that enables one to discriminate between the right and the wrong. Serving as a moral guide, it leads one toward a virtuous life. The concept traditionally has religious overtones as we as God's creation are expected to be just, kind, compassionate and altruistic. In the religious tradition conscience belongs to the realms of the inner self, actually inheres in the noospheres and as such is taken as given. When faced with a decision situation a person's conscience would invariably "call" him or her to act in a particular manner. Responding to this call is a matter of one's free will or volition. As a behavioural construct, to the author, conscience is situated at the crucial intersection of the inner and the outer worlds.

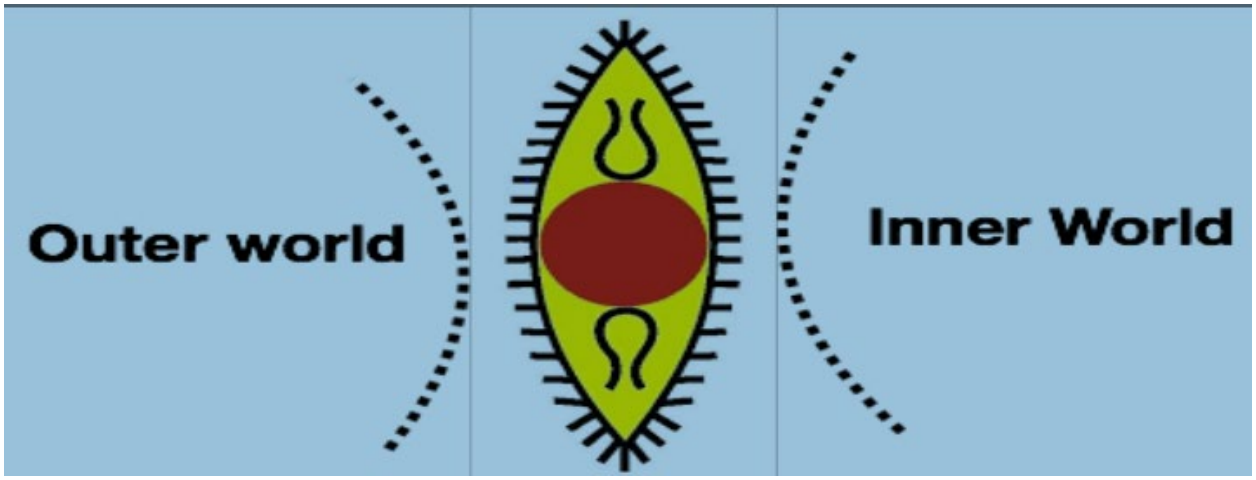

Figure-2: Locus of Conscience

Note: *The inverted eye in the above figure is the logo of SPIC MACAY i.e. the Society for Promotion of Indian Classical Music and Arts Among Youth, a movement that stimulates youth's sensitivity and sensibility toward higher ethos of living through music and art. The author is a SPIC MACAY volunteer and has rendered the logo's interpretation as "look within."*

Conscientious Commerce

We operationalize the definition of conscientious commerce as "becoming and behaving ethically, socially and environmentally aware, responsible, and, engaged as individuals, consumers, investors, business-persons, managers and as corporations and society" (Saxena, 2014). The concept developed here is inclusive i.e. it posits the imperative of conscience based commerce as a pervasive construct, unlike other concepts that place the onus only on the business firm. How it works? Think of a corporation where the major investor is a family. Key employees are family members. It predominantly sources its inputs from a member of extended family in that business. And its major customer also is another member from the extended family. Would one expect the familiar conflict of interests, power play and expropriation between the employees, investors, suppliers and consumers prevalent in other organizations? Would it be unlikely that the customers of such an organization allow a price hike so that better facilities could be given to the employees? Is it impossible that this limited, selective altruism paves way for more global and cosmic altruism? In other words, is it not likely the inner voice that listens and sees connectedness within a narrow, primary group / community does so also for the larger cosmic,

ethical and socio-religious orders? Conscientious commerce is differentiable from the concepts of CSR, strategic CSR, balanced scorecard, triple bottom line, business ethics and corporate governance. Whereas all the foregoing concepts pertain to business's concerns vis-à-vis stakeholders with the latter being considered exogenously, the concept of conscientious commerce considers the stakeholders endogenously. Moreover, whereas the other concepts are posited as furthering business's enlightened selfinterest, the concept of conscientious commerce is built on the edifice of the enlightened self's interest where the outsider looking in and insider looking out perspectives of business converge.

Communicating Conscientious Commerce

The author floated the idea of conscientious commerce in 2011 when he designed a pan university- University of Delhi- festival of business, economics and management, entitled 'Oasis.' Primarily targeted at the undergraduate students in these disciplines the festival comprised of activities – competitive, non-competitive and collaborative- built around a credo of conscientious commerce. The credo enunciated the following principles:

• Rather than always being a go-getter, reach out and become a go giver too.
• Rather than always being a leader, try and become a good follower too.
• Rather than forever aspiring to be a winner, learn to become a good loser too.
• Prefer goodness over greatness.
• Serve to deserve. First deserve then desire.
• Frugal habits; honeybee like consumption

The underlying moral /ethical appeal is "a loaf of bread earned through righteous means is more valuable than a feast out of expropriation." Since 2011, in the wake of the discovery that another festival named Oasis predated ours, the name of the festival was changed to Zucitva later [deriving from the Sanskrit word 'Shuchita'] implying purity, integrity and honesty. Albeit, we continued with the serious attempts to sensitize and engage the young minds toward the ideals of conscientious commerce. A small handout comprising comic characters engaged in conversation on the topic was prepared and shared with the students. Activities and rewards were structured around diverse manifestations of conscience driven businesses. We shall be reviewing these activities in the later section. For now we focus on the campaign that we carried out elaborating the meaning and rationale of conscientious commerce (TNN, 2011). The cartoon strip originally comprised Indian characters and was bilingual (Hindi and English). However, what we present here are the excerpts from it with an international appeal. The joint statement from the three characters chosen here, viz. Faith, Ikechi (meaning God's strength) and Sumedha (meaning pure intellect) reads as follows:

"We do not seek such higher qualifications from premier institutions to achieve by hook or crook! Rather we seek to learn to lead a healthy life of contentment, peace, happiness, hope and harmony!"

See, Figure-3.

C20

Environmental Sustainability _ Ways And Means

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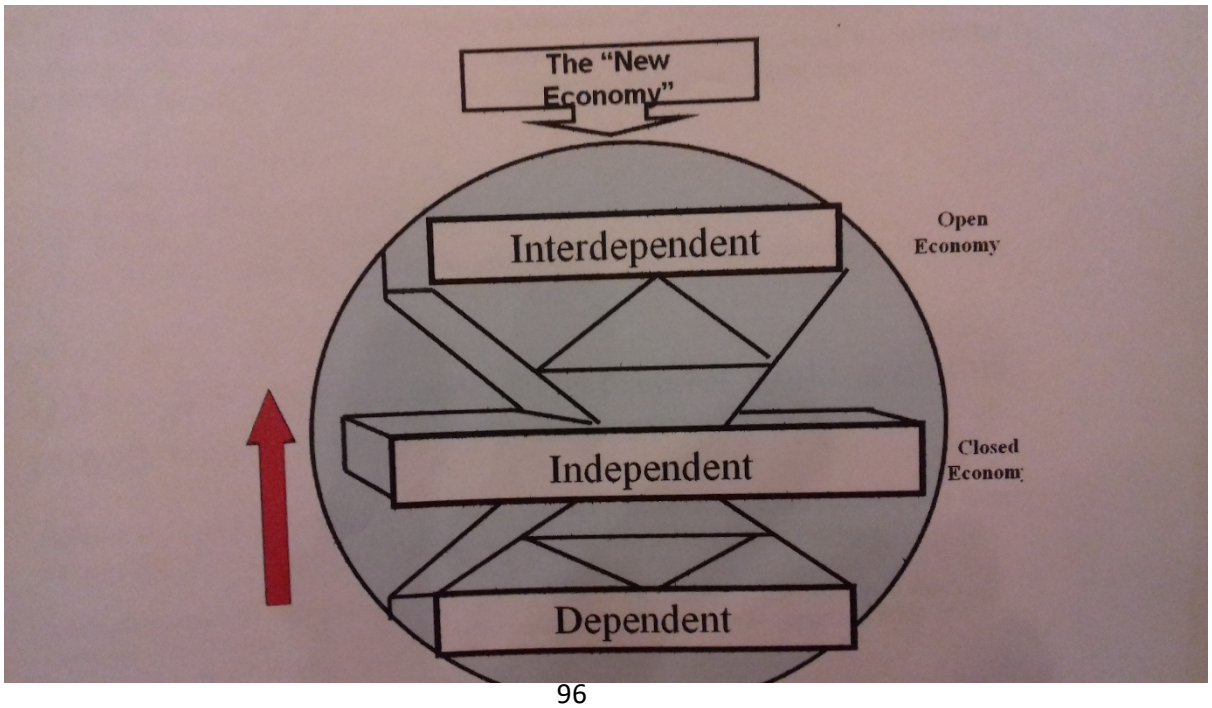


This Research paper For presentation at ICSE 2019, Named “ENVIRONMENTAL SUSTAINABILITY _ IT’S WAYS AND MEANS ,Has been dedicated to my own mother SMT. RAJKUMARI SAINI , WHO along with my other siblings ,made me worth contributing towards this education sector.

No.5

Objective of the Study?

Economic growth contributes most to poverty reduction when it expands the employment ,productivity and wages of poor people and when public resources are channelled for promoting to human development.

The process of widening people choices and the level of well being they achieve are at the core of the notion of human development.

Traditionally, the population of the country has been considered as a liability on the natural resources, but looked at from another point of view ,Population becomes an ASSET.

The primary objective is directly related to the topic mentioned as Subject title for research. Understanding is a simplified term used for Demystifying which makes any human capable of thinking rationally n then working accordingly This human when becomes the leader of any group or so called Team works as per the set standards to the best of his or her capabilities to reach the desired goal or set End point for the benefit of All. The corporate social responsibility remains the first criteria while working as a Builder of team. As Head all activities are monitored under his or her direct or indirect supervision depending upon the structure of the team.

The secondary objective linked to the primary is to check the Capability Model Management CMM framed to check the potential and applied intelligence to maintain the degree of authority at the given work place which does take into account the CRISIS Management.
The objective also intends to answer the key process areas related to the tactical corporate strategy keeping in mind the set ethical standards of Indian Economy. The way to reach its goal and outcomes obtained -Are they matching with the objectives laid down at the time of planning to decision making till the final stage ,reached after having covered the journey so far.

Pg no.6

THE ABSTRACT

Any nation that works for the welfare of its humans ,certainly has to check the human orientation and values . There are many components of National Development activities attached to it.

While handling any issue be it at a local , state , national or international levels , we are still confronted with challenging human problems in every field of national progress.

Today ,Other countries of the world have more respect for human values than we have. AS a Nation we must address this question very seriously.

How to infuse human values into our national n corporate life ?Human values like hard work truthfulness obedience, Good manners ,peace n Harmony etc. Are still lacking in Indian social and political environment.

We as a Nation are growing as a developing economy yet there are several other big challenges to be met for improving our global status.

We may sum it down as-

1 lack of human values and orientation

2 physical n spiritual malnutrition

3 existence of social evils.

4 lack of discipline -individual n as a whole

5 National pride and commitment are either missing or rarely available or can be found.

We thus need to set up a TEAM Starting from local / State / National and then Internationally in order to enhance the overall capacities of the existing system for further enhancement to have a disciplined atmosphere which should prevent unnecessary losses in the performance cycle anywhere n every where.

While discussing the Environmental pollution problem for instance we can take example similar to the one of any other organisation.

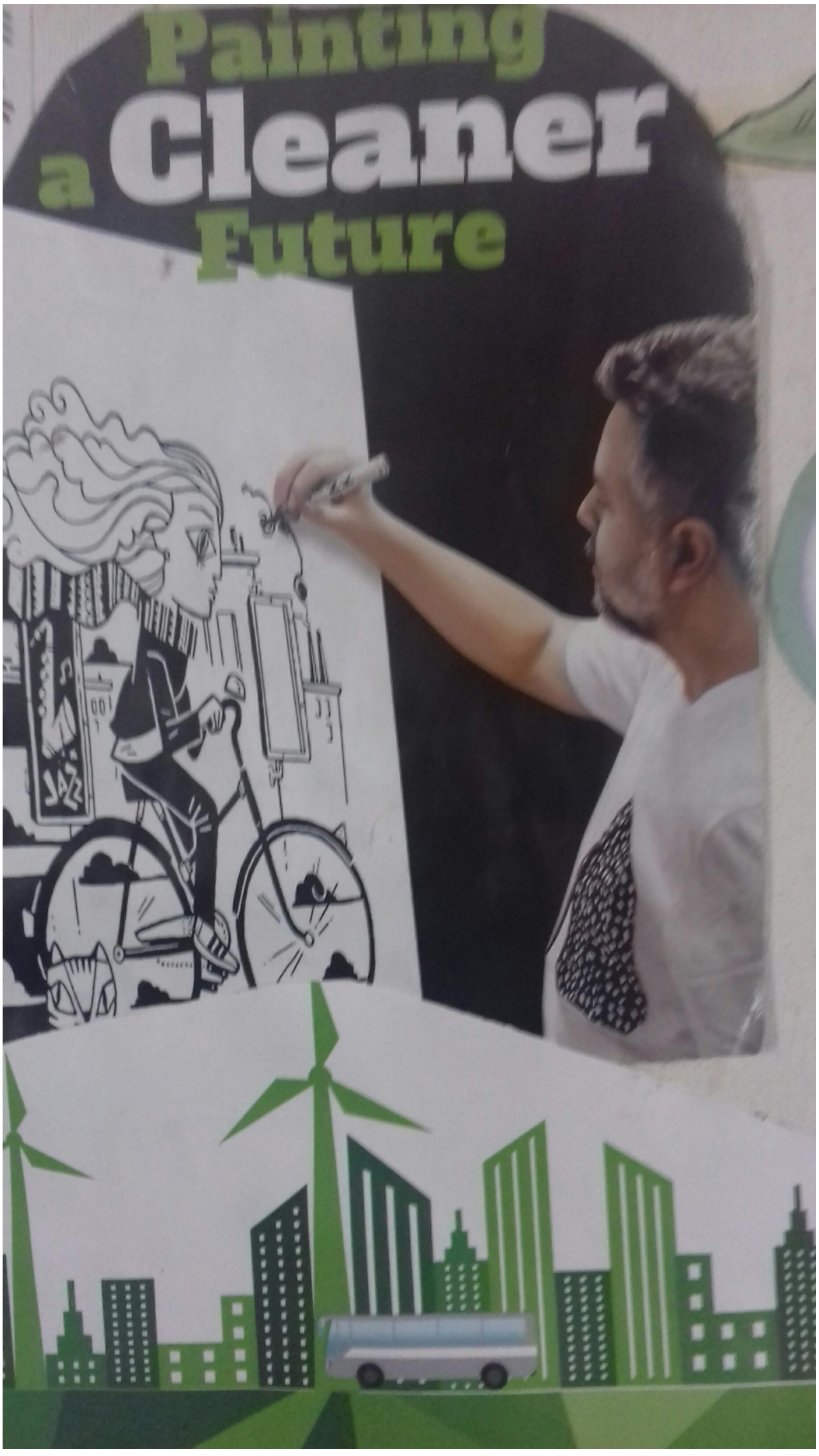
The organisation works with a target to strive to be better than the best competitor in the market. The

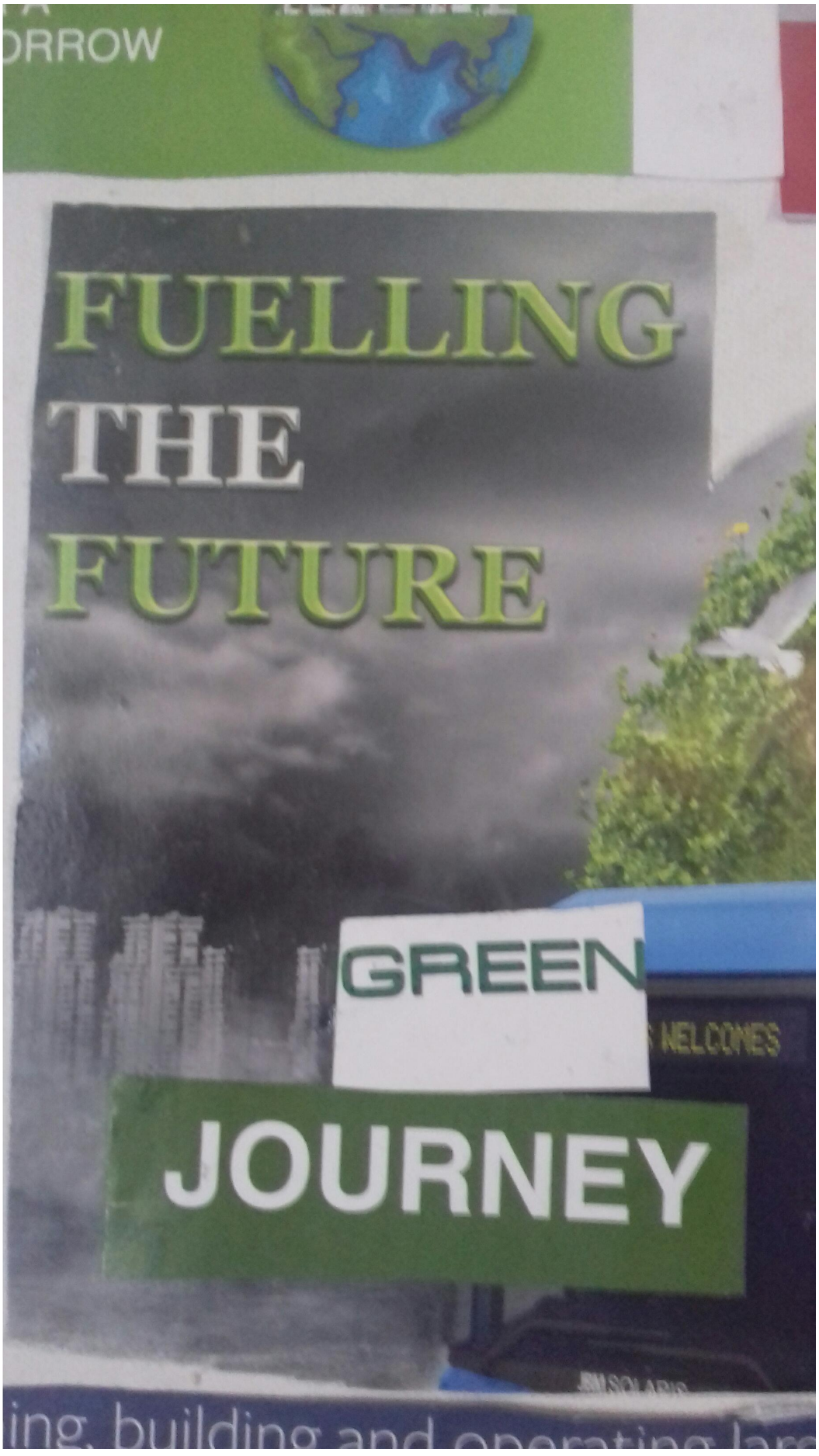
unnecessary cost if not taken care can drain off roughly 20 to 30% revenue of it.

All companies try to reduce their Appraisal Costs, internal failure costs, external failure costs and eventually the cost of lost opportunities. The key areas of waste in a company include material, capital and time of which TIMES has the biggest cost.

Each n Every person in any organisation is responsible for the Total Quality Management (TQM).

- pic 1 n 2 simplify the conceptual framework here.


Painting
a Cleaner
Future


ORROW
FUELLING
THE
FUTURE
GREEN
JOURNEY

5. A Detailed view as an HR Person

The Study of values is fundamental to the understanding of Management and organisational behaviour.

A manager's values determine the managerial functions he performs.

A manager's value system plays a significant role in the performance Appraisal of his subordinates.

The job of planning, organising and controlling the behaviour of employees should be compatible with managerial value.

Values lay the foundation for the understanding of perception, attitudes and motivation of people.

VALUE Based Management can be promoted by the following factors-

1. Environmental Source-factors like natural resources,culture,peers,siblings n other social groups like institutions, spiritual clubs help in value formation.
2. Influence of superiors – Parents,Elders,Teachers, Religious Leaders etc. All help in the same value creation.
3. 3.Media-Newspapers, Radio,TV, magazines, journals and online availability of social media groups facilitates the process if taken in a positive stride.

In the era of rapid technological advancements throughout the world and economic liberalisation in India, new challenges are emerging in the Indian Business Environment.

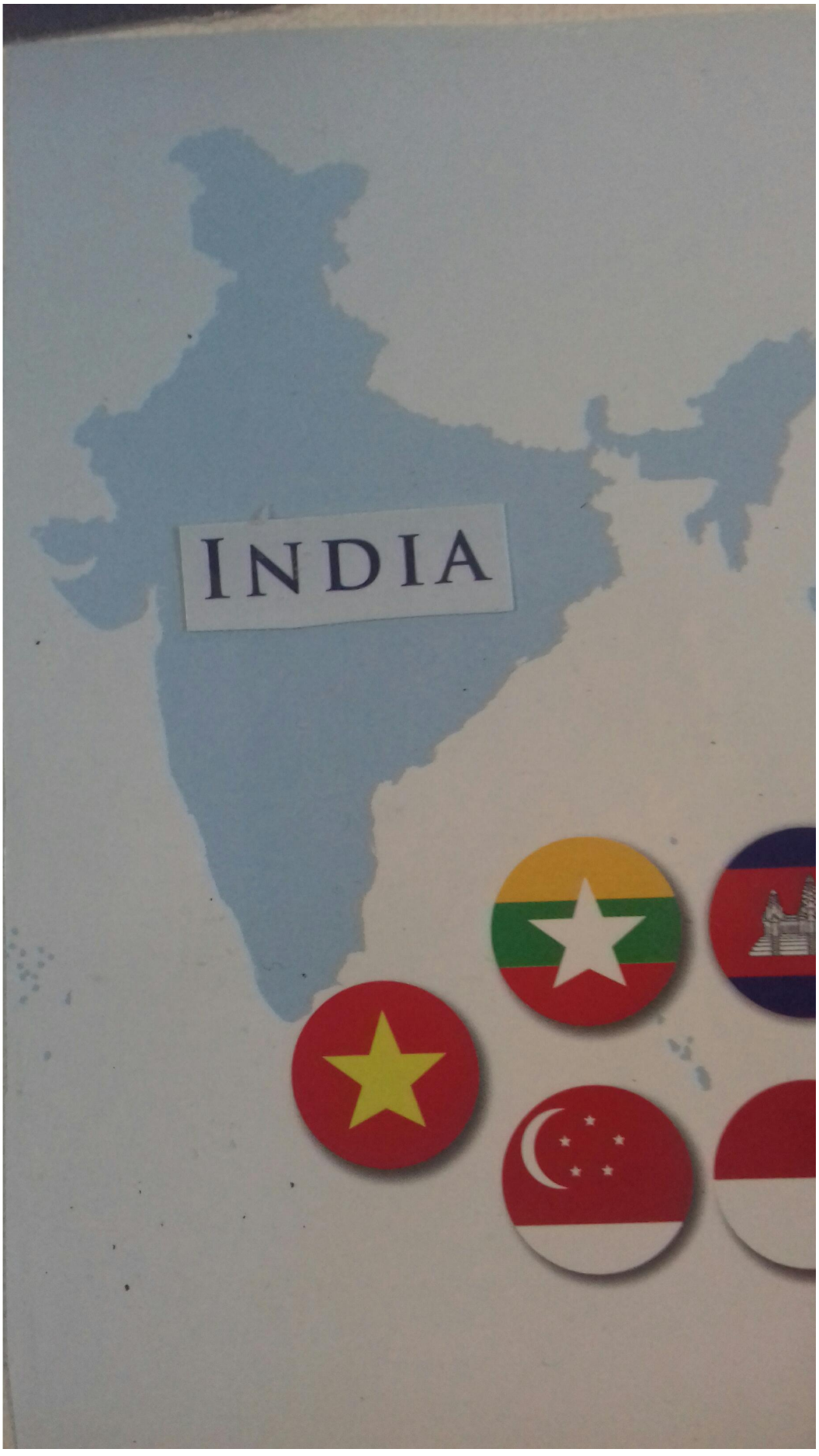
In the changing perspective ,only those organisations which have the capacity to compete n survive would emerge and take over the place of old ones.

Organisations which value the two basic principles

1 Human Values

2.Holism

Which refer to spiritual ,ethical and moral values And oneness or unity of soul, body and mind and intellectual, Have a diversified value based holistic approach and much better than western model of Management.


INDIA

CONCLUSION WITH PROPOSED SCOPE

Today in India ,we see commerce through corruption,administration through bribery and politics thru blackmail.

Business is done with sole motive of earning more n more of profit which actually is not right.people are forgetting the importance of their worth n the worth of others in context to human values n beliefs.

Under modern production system,the top management and workers or employees are separate entities_Their approach is different,their interests are diverse and claims are conflicting.

To the Modern Management, The worker is everything,MAN STANDS NOWHERE.The moment he stops catering to the needs becomes a useless creature n thus discarded,like a hired commodity and a quick rejection notice is issued.

In view of the above All Team Builders need to understand the core human values from planning till decision making irrespective of its stages.

These values if given due recognition n importance play a significant role in uplifting the Name n fame of the Brand .

Maintaining the Brand name means saving it's market image ,prestige n thus the Ultimate REPUTATION.

Having kept in mind these bullet points of a value based system all teams can reach the desired goals.

This requires a lot of thinking, emotional check and research related to sensitivity analysis.

These if handled carefully can help in bringing peace and harmony on the entire globe

A NOTE with Vote of Thanks

Thankful to Almighty, Gurudev H. H swami SIVANAND Ji Maharaj of The International Divine Life society, H Q Rishikesh / INDIA ,

Parents n Teachers and all others who have helped me in learning ,Because of them only self could reach this point of submission.

The Cause and Effect theory about Environmental Sustainability

Remains important n centred upon the key factors contributing

mainly to the Economy of that very nation.

THANKS TO THE INDUSTRIES LIKE HERO F. FUTURE

AND JBM GROUP FOR PROVED SOLUTIONS TO

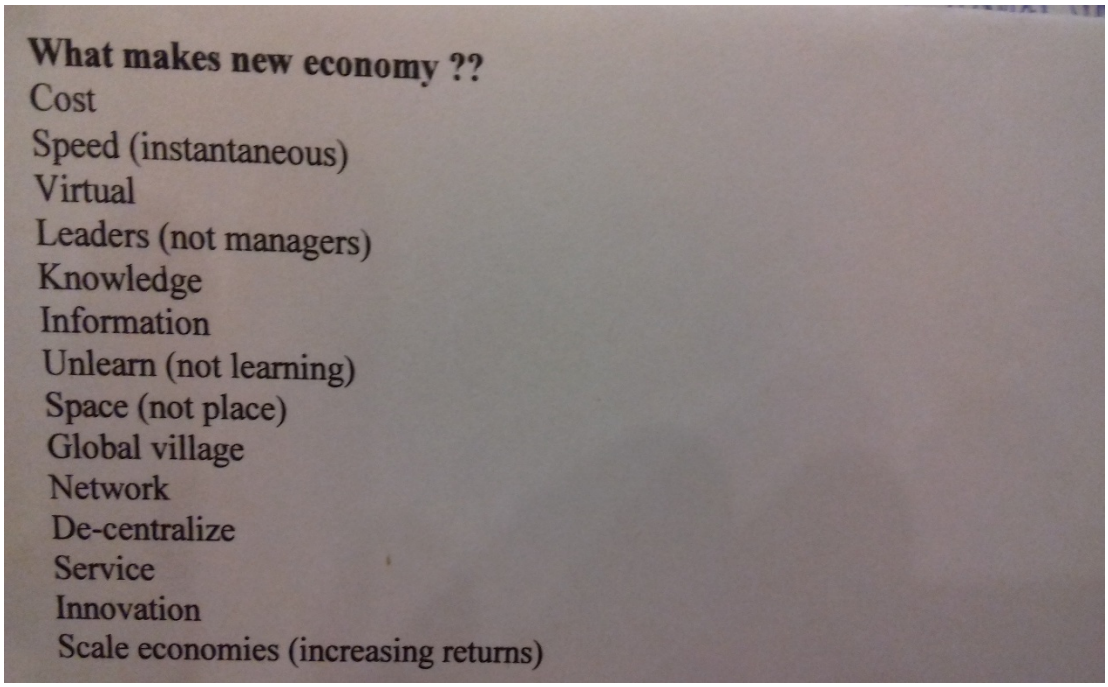
1. ROOFTOP SOLAR WORK
2. ELECTRIC MOBILITY ECONOMIC SYSTEM

Self Can be contacted on the given numbers or through email I'd

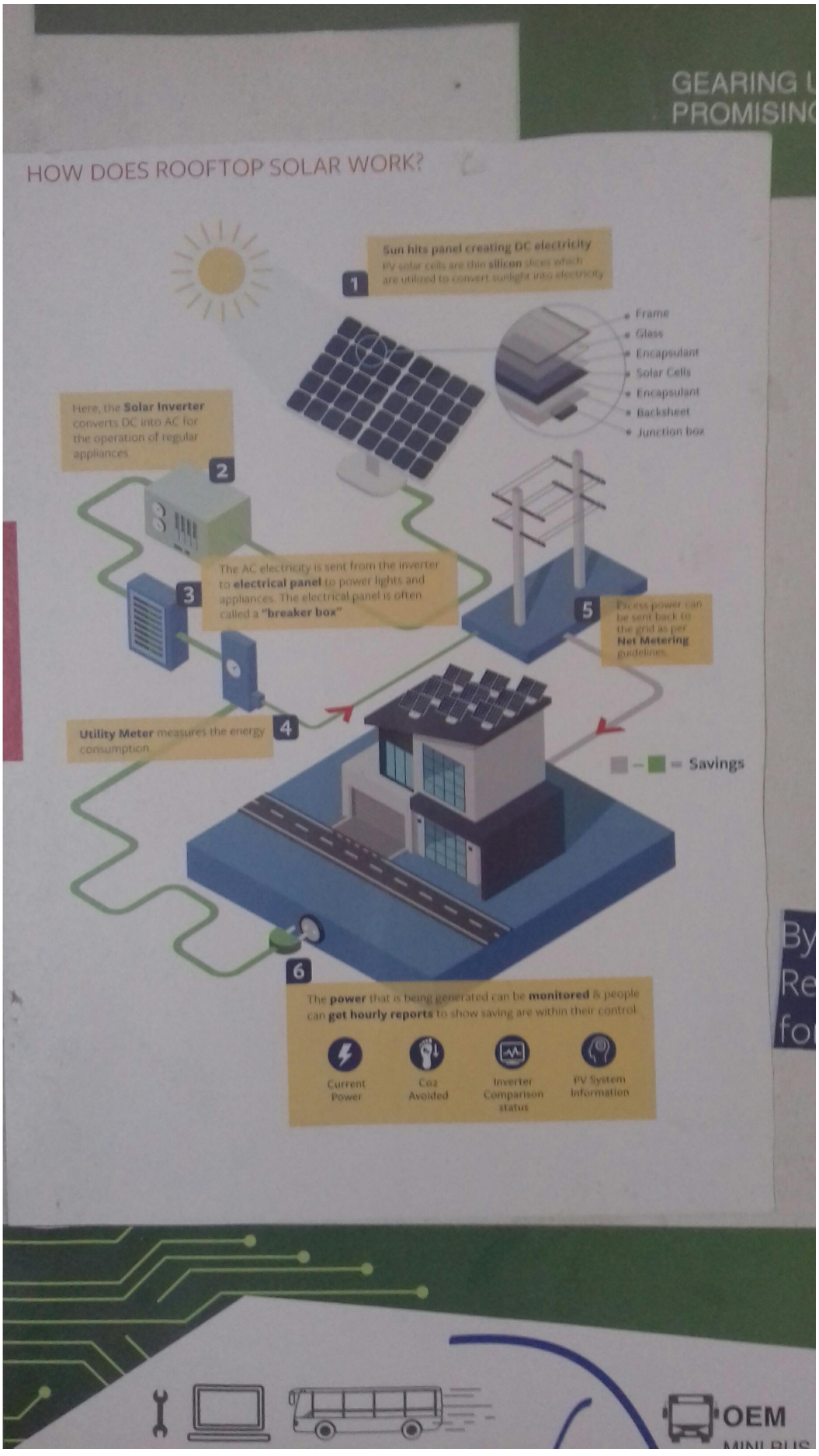
NETWORKING SITES LIKE _

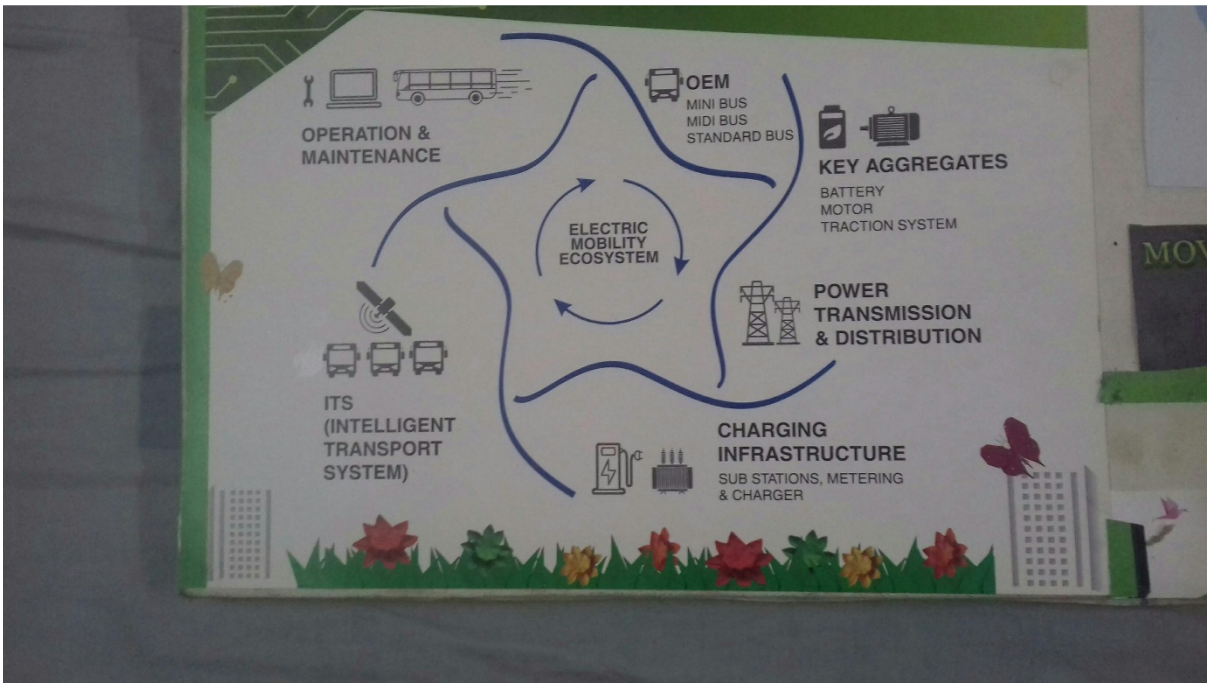
TWITTER/SKYPE/FACEBOOK AND LINKEDIN

OR MAY BE WHAT'S APP CAN BE APPROACHED.



ABSTRACTS


HOW DOES ROOFTOP SOLAR WORK?
Sun hits panel creating DC electricity
PV solar cells are thin silicon slices which are utilized to convert sunlight into electricity
1
Frame
Glass
Encapsulant
Solar Cells
Encapsulant
Backsheet
Junction box
Here, the Solar Inverter converts DC into AC for the operation of regular appliances
2
3
The AC electricity is sent from the inverter to electrical panel to power lights and appliances. The electrical panel is often called a "breaker box"
5
Excess power can be sent back to the grid as per Net Metering guidelines
Utility Meter measures the energy consumption
4
= Savings
6
The power that is being generated can be monitored & people can get hourly reports to show saving are within their control
Current Power
Co2 Avoided
Inverter Comparison status
PV System Information
OEM


OPERATION &
MAINTENANCE
OEM
MINI BUS
MIDI BUS
STANDARD BUS
KEY AGGREGATES
BATTERY
MOTOR
TRACTION SYSTEM
ELECTRIC
MOBILITY
ECOSYSTEM
POWER
TRANSMISSION
& DISTRIBUTION
ITS
(INTELLIGENT
TRANSPORT
SYSTEM)
CHARGING
INFRASTRUCTURE
SUB STATIONS, METERING
& CHARGER

ABSTRACTS

THEME D - SUSTAINABILITY EDUCATION IN THE SCHOOL EDUCATION SYSTEM

D1

Sustainability Leadership Programme

For 21st Century Learners

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ABSTRACT

World is facing insurmountable problems, an economy which is promoting inequality, and is failing to provide a decent employment to majority of its population. A society which is corroded by discrimination, violence, intolerance and insecurity. And an environment, which is dealing with complex issues like climate change, loss of biodiversity, natural resource depletion, food insecurity, and increasing levels of pollution resulting in negative consequences on human health and livelihood. However, our schools are isolated from these realities. Not just the content but also the way the content is delivered is redundant for the 21st century learners. The challenge today for our education systems is to make learning meaningful and relevant for students of today. Education of this 21st century, thus, must prepare socially responsible leaders, empowered to take informed decisions and responsible actions for social transformation.

At an individual level, these problems appear enormously large and beyond control. Ironically, these are all human-induced, resulting due to the cumulative effect of our choices and decisions. Even though most of us know that the way we are living today is beyond the planetary boundaries, this knowledge is not resulting in any action. Thus, challenge today for our education system is to bridge this knowledge-action gap. What is needed is strong leadership in students to act purposefully, collaboratively and committedly. For this to happen, policy makers, curriculum designers and teachers need to introspect with a new lens to answer questions like what motivates the modern day student to learn, does contents like waste management, biodiversity conservation, green-house gas emissions, malnutrition, and others are more appealing and relevant today; what are we trying to achieve with education, what our ultimate learning outcomes should be, what competencies or skills are needed for present learners; and lastly, how to stimulate those capabilities, what pedagogical approaches will serve the purpose?

The paper is an attempt to answer the above questions on learning content, outcomes and pedagogies for the 21st century learners. The paper proposes "*Sustainability Leadership Programme*" consisting of thirty activities on five themes – namely biodiversity, energy, water, waste and food, which engages learners in inter-disciplinary, participative, open-ended, reflection based, collaborative process and aims to empower school going students (13 years and above) with crucial competencies, like systems thinking, problem solving, critical thinking, normative competency, anticipatory competency, and others, catering to all three learning domains-namely cognitive, socio-emotional and behavioural. To prepare the activities, the researcher studied various resource books, activity manuals, guides, teacher handbooks, and thematically analysed qualitative data using the principles of framework analysis. OECD (Organization for Economic

Co-operation and Development) constructed a framework to help shape what young people needs to learn in order to 'act' or 'respond' to the agenda 2030. In this framework, the need to focus on competency development is highlighted, which is defined as multidimensional learning domain, encompassing three dimensions, namely knowledge (cognitive), skills (behavioral) and attitudes and values (socio-emotional). The program thus developed, can be implemented though eco-clubs of the schools, which are mandatory part of schools in India, and it will be followed by development of a project based on the principles of theory of change. The program will not just help in strengthening the functioning of eco-clubs but inspire the school community to embed sustainability in all aspects of the school culture namely, governance, teaching and learning, community partnerships, and facilities and operations. Besides the social projects designed by the students, the program will also be evaluated on the learning objectives attained by the students using self-developed rubrics and the feedback from the participants on the activities conducted.

Keywords: Sustainability Leadership Programme, Competency Building, School Education

D2

Building 21st Century Competencies For Sustainability Leadership – An Action Research

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ABSTRACT

The youth of today is growing up in an interdependent, complex and uncertain world, compelling everyone to redefine the landscape of education and work. Preparing learners for work, citizenship and life in the twenty-first century is daunting. Gender inequality and poor health, poverty and consumerism, natural disasters and food insecurity, amidst persistent disengagement among youth and high early dropout rates calls for our school education to become more relevant for our students. There is general agreement that our students today need to have certain key competencies that allow them to engage constructively and responsibly with today's world. Education, thus, must respond to the new 2030 Agenda for Sustainable Development by preparing the new generations in dealing with these sustainability challenges. To achieve this, UNESCO has been promoting Education for Sustainable Development (ESD) since 1992 which led to dedicating a whole decade (2005 to 2014) towards furthering activities that strengthens ESD, and is now directing its efforts towards the Global Action Programme (GAP) on ESD.

What was designed for the industrial era of the 19th century now fails to serve our children, our communities and our planet in the 21st century. The current global challenges have local repercussions, e.g. climate change is affecting lives all across the globe in different ways. Simultaneously, local efforts have global consequences, e.g. reducing individual carbon footprint can improve the health of children experiencing respiratory issues in another part of the country. In this light, the sustainability leadership programme was designed to stimulate the much needed competencies empowering learners to contribute towards achieving ambitious and crucial global agenda of sustainable development. Education is not only an integral part of sustainable development, but also a key enabler for it. It is not only a goal, but also a means for achieving an end. This research has been essentially conducted to respond to this pressing need by defining relevant learning objectives, broken down into specific knowledge, skills, and attitudes and values, introducing pedagogies that empower learners, and urging schools to include sustainability issues in their day to day activities. This is the second paper in the series of two papers on sustainability leadership. The first paper was a conceptual paper wherein sustainability leadership programme was designed for school students, however this paper is empirical in nature, as the programme was implemented in a government run school in Delhi, India, i.e. walking the talk. The activities planned in the programme were negotiated with the head of the school and had to be re-designed keeping in mind the school annual calendar and other mandatory requirements from the Directorate of Education, Delhi. However, the researcher has demonstrated the promise and potential of sustainability education to restore vibrant, engaged learning within our schools, by organizing inter-disciplinary, participative, open-ended, reflection based activities related to gender, cultural diversity, health and hygiene, biodiversity, disaster risk reduction, and others. For the purpose of implementing the activities of the sustainability leadership

programme, action research was adopted, wherein the researcher attempted to step beyond the factory model of schooling to a model that better serves children's learning needs, as well as local and global environmental, social, and economic needs. This action research is participatory and democratic research, which allows for socially responsive actions, meant specifically for a particular context.

The effectiveness of the intervention in terms of competency building was evaluated using a self-developed rubrics. The researcher prepared a comprehensive rubrics breaking down each competency into clearly defined knowledge, skill and attitude and values it comprises of. The results and findings of the study were also drawn by conducting a focus group discussion with the participants and by seeking feedback from the teachers and principal of the school. This research is intended to benefit school teachers and curriculum developers by being reflective practitioners when planning pedagogical approaches for the 21st century learners. The knowledge gained through action research can empower students, teachers, and managers and enhance learning, teaching, and policy making.

Keywords: Sustainability Leadership, Competency Building, School Education

D3

Multi-layered Plastic Management in Educational Institute

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Introduction

In India, with an increase in working population and improved standard of living, there is a growing demand for packaged foods and beverages. Packaging industries use Multi-layered packaging (MLP) to improve shelf life, transport and storage. The drawback of this type of packaging is that it cannot be recycled and hence lies unattended in the landfills.

Global Alliance for Incinerator Alternatives (GAIA) conducted a study in May 2018, across 15 cities in India, results of which showed that 53% of plastic waste generated comprised of MLP. Plastic Waste Management Rules, 2016, states that, companies under Extended Producers Responsibility (EPR) need to collect MLPs used by them to package their products. Thus, manufacturers have taken initiatives to setup MLP collection centres in the cities. But unless these initiatives are backed by programs which educate and create awareness about identification and collection of MLPs in the general population, their success will be limited.

Method:

There is a lack of awareness on what is multilayer packaging and also ways to manage the MLP waste generated. As one of the largest consumers of packaged food, students can be empowered to help tackle this problem.

NGO Rnisarg Foundation along with Smt. Sulochanadevi Singhania School, has partnered with Safai Bank of India (SBI), in its initiative of MLP waste management. NGO Rnisarg Foundation empowers school students by taking awareness sessions in the school. Safai Bank is an initiative of Mumbai Sustainability Centre, which works on the concept of a regular bank wherein educational institutes create an account and deposit the MLPs and record the collection on an online portal every fortnight. Physical pickup of collected MLP is done by safai bank when the collection quantity of 10,000 plus wrappers is reached, this helps keep the collection, transportation and end disposal of waste, a sustainable process. The collected wrappers are sent to a cement kiln for co-processing by SBI team.

Through this project, the school is now a MLP collection centre for its 6000 students and their families. Through neighbourhood MLP collection drives, school also aims at providing MLP deposit service to the surrounding community.

Impact:

The project aims to achieve following objectives:

- Sensitize students towards the impact of MLP waste on environment
- Create environmentally conscious consumers in the younger generation
- Build a tool which provides information of the brands which create most MLPs and also a real-time display of collection statistics.
- Empower the students to voice their opinions for better alternatives

Conclusion:

With increase in consumers of FMCG products, there exists an urgent need to create environmental education about MLP waste in the consumers. Educational Institutions can bridge the gap of lack of awareness, through educating the students and their families. Also, the challenges of collection and storage can be overcome with schools providing the location. Student led action by these educational institutes will ensure that enforcement of EPR norms is regulated and monitored, so that companies put their resources towards better systems of products packaging.

Keywords: MLP waste, awareness, collection, EPR

D4

Transforming Education to Future Proof Societies

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Aristotle said, “The purpose of education is to ensure the flourishing of the individuals characterised by the 'goodness' of character and 'goodness' of intellect.” In Sanskrit, we say, "*Vidya Dadati Vinyam*," meaning that education brings humility. Unfortunately, character building has taken a back seat. The entire focus seems to be on maximising academic performance. Ron Miller, one of today's significant thinkers on holistic education, puts it succinctly, "Education today is not a collaborative art of mentoring and nurturing the young, but a frenzied scramble to succeed according to some external measure of success.”
Transforming education for sustainability requires the system’s shift approach. The teachers must eschew to be a broadcaster and acknowledge that there are several alternative sources to knowledge. The classrooms need a redesign to elicit students’ love for learning and self - development. The pedagogy must shun predictability and encourage curiosity, innovation, and participation. Schools are a place where students learn to become responsible citizens and engage in community development.

A set of 17 goals adopted by the united nations under the Sustainable Development Goals offers a roadmap for the future of education. Young children must recognise that poverty, hunger, inequality, lack of opportunities, and climate change are a curse to society. Each child must know that the increasing environmental risk is costing heavily, peace is imperative, and building partnership is a necessary condition for the prosperity of all. Education for the future built on strong character education and social-emotional learning should address these global concerns. The seventeen goals are the new classroom objectives around which new pedagogies and assessments should revolve.

The present paper discusses a practical, scalable framework for sustainable education in schools. The task of initiating mindset shifts can be performed by transformational schools and transformational leadership, experiencing and facilitating positive changes. Schools with a clear vision, positive culture, participative decision making, and modelling best practices have higher chances of making a change.

Key words: Sustainable education, SDGs, Climate Reality, Global Citizenship
*Ashok Pandey, Principal, Ahlcon International School, Delhi and
Partner UN’s #Act4SDGs, #TeachSDGs Ambassador

D5

Implementation of eco school program promoting the sustainable development in secondary schools of Mongolia

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Abstract

A total of 292 schools and 23 kindergartens are operating out of 803 schools in Mongolia within the framework of the international eco-school program based on sustainable development education principles promoting the World Sustainable Development and Sustainable Green Development of Mongolia.

“Information and Training center for Nature and Environment”, member of Foundation for Environmental Education /FEE/ and a national operator organization, organizes the annual selection for the activities of registered secondary schools and kindergartens. The 4th National Assembly of Eco School Program was held on 07 November 2018, where 9 schools were awarded with "Green flag", 27 schools with "Silver Gerege" and 45 schools with "Bronze Gerege".

“Information and Training center for Nature and Environmental” conducts its activities regularly for 15th year and provides with instructions and recommendations to all schools on defining the current conditions of the school environment in compliance with eco school program implementation methodology and defining the needs and grounds of further improvement of the environment. Besides the eco-school program, these schools have begun implementing Young Reporters for the Environment (YRE) and Learning About Forests (LEAF) programs.

Table 1. Subjects of Eco school program in Mongolia

Article 1.3.1 of the Action Plan for the implementation of

"Education for Sustainable Development" national program approved jointly by Minister of Nature, Environment and Tourism, and by the Minister of Sport in October 2018 specifies that “*Involve 50 percent of total elementary and secondary schools into the eco school program, increase the number of schools with international eco school certificate to 80, and organizes the nationalassemblies at least 5 times*." In accordance with the Sustainable Development Concepts, Green Development Policy, National Program on Sustainable Development Education (2018-2022) and ISO14001 environmental standards, the “Information and Training center for Nature and Environment” is implementing the International eco school program in a scope of 11 topics. /Table 1/

The first topic to be implemented in schools involved into the eco school program is "School environment". According to Regional Development Concepts of Mongolia, totally 21 provinces are divided into 5 regions depending on the economic region of Mongolia. We are implementing "School environment" in 19 provinces out of 21 provinces and they are working on a number of additional topics for schools and kindergartens awarded with certificates and prizes.

The first province involved into the eco school program in 100% is Selenge. This is result of multi-year cooperation between Education and Culture Authority of the province and "Information and Training center for Nature and Environment". The schools involved into the program are operated within 7 steps of the eco school based on the research methodology learnt from us. Information of 7 schools1 in Selenge province, which received the awards in November 2018, is shown in a following table 2.

№	Subject name	SD Goals
1	School environment	SDG: 2, 4, 5, 8, 17
2	Waste and litter	SDG: 3, 4, 5, 8, 11, 12,17
3	Water	SDG: 3, 4, 5, 6, 8, 17
4	Energy	SDG: 4, 5, 7, 8, 17
5	Transport	SDG: 9
6	Biodiversity	SDG: 4, 5, 8,15, 17
7	Responsible mining	SDG: 13, 16, 17
8	Global citizenship	SDG: 1, 4, 5, 8, 10, 16,17
9	Desertification and degradation	SDG: 4, 5, 8,13, 17
10	Healthy lifestyle	SDG: 3, 4, 5, 8, 17
11	Forest	SDG: 4, 5, 8,15, 17

Table 2. Information of school №	**Name of the school**		**Number of planned works /step 3/**		**Funding spent /MNT/**
School environment			**Additional topic**		
Outer environment			**Internal environment**		
1	School of Eruu soum	11	4	5	137,979,000
2	School of Bayangol soum	4	4	3	1,237,800
3	School number 3 of Mandal soum	3	2	3	31,382,000
4	Khutul school of Saikhan soum	16	19	-	13,468,000
5	School number 1 of Sukhbaatar	15	22	7	108,143,500
6	School number 2 of Sukhbaatar	5	7	-	369,500,000
7	School of Shaamar	2	2	-	10,543,200

Total	**56**	**60**	**18**	**672,253,500**

Above table shows that schools insert the works required to do in Column 3 and 4, and the funding required in Column 6 with purpose to create environmentally friendly, healthy, safe and green environment on basis of our methodological assistance and legal documents of Mongolia. For example, the school of Eruu soum did 11 works for the external environment and 4 works for internal environment. This school has spent 137,979,000 million MNT for implementation of 11 works to create the healthy and safe green environment in 2017-2018.

We have been doing the research to save the environment through all the people studying and working in the educational organizations of Mongolia, not to make worse the environment and the most important is to plant the seeds of the right attitude in the people's hearts by our methodological management.

1 Implemented successfully "School environment" of international eco school program within 7-step management framework.

D6

Paryavaran Mitra Programme-Strengthening Sustainability Education in Schools

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Abstract

The central thrust of Education for Sustainable Development (ESD) is "not learning for the sake of learning but is learning for the environment and is action oriented." In ESD learning must be authentic and activities should require the application of knowledge and skills in real life situations. The Paryavaran Mitra programme aims to strengthen EE as mandated by the Honorable Supreme Court of India in its judgment of 18 December 2003 and directed that the National Council of Educational Research and Training (NCERT) shall prepare a model syllabus and also directed that "we accept on principle that through the medium of education, awareness of the environment and its problems related to pollution should be taught as a compulsory subject". Through the scholastic and co-scholastic approach, the programme is strengthening the implementation of the Supreme Court judgment by suggesting both, class activity-based approach and action projects. The Paryavaran Mitra programme, initiated in 2008-09 as a campaign on Climate Change Education, has developed as the flagship school programme that brings together Centre for Environment Education (CEE) 35 years of experience in Environmental Education (EE) and ESD. Programme involves students in problem solving by engaging them in action projects. The action projects taken up by students may or may not lead to immediate or significant improvement, but will definitely lay the foundation for sustained efforts through learning outcomes in form of knowledge, disposition, competencies and behavior. In Project Based Learning (PBL), action project/s is an extensive task taken-up by a group of students to apply or illustrate classroom learning. This extends the boundary of education from information to experience. The Paryavaran Mitra programme was formally launched in Ahmedabad on 24 July 2010 by the Paryavaran Ambassador of India, Dr. APJ Abdul Kalam with a goal to create a network of young leaders, from schools across the country. The programme focuses on class 6 to 8 and follows the infusion approach by promoting active teaching–learning methodologies that bring in an environmental perspective to concepts and topics taught in the curriculum. Online resource material for the programme are provided to the schools to carry out action projects focusing on local environmental issues in the five themes of the programme viz; Water and Sanitation, Biodiversity and Greening, Energy, Waste management and Culture and Heritage. Paryavaran Mitra programme was selected as one of the „Good Practice Stories on Education for Sustainable Development" by United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2014. The paper, by reviewing some exemplar experiences from the Paryavaran Mitra schools across India seeks to examine the learning-by-doing approach (John Dewey, 1938) in the class and curriculum transactions and also active participation by all members of the school community in addressing the issues related to the five programme themes in the school context, through action projects. The paper talks about the journey of the programme since 2009 and discusses how the programme has helped schools adopt activity based learning approach to foster experiential learning in students. The paper also provides case studies of Paryavaran Mitra schools doing exemplar projects and proving examples for other schools to follow and act. Environmental conservation and living in harmony with nature has been deep rooted in various

cultures across India. With changing lifestyles and consumption patterns, instead of romanticizing the past, there is a need to re-establish the values and behaviour that will promote sustainable development. With a network of 8596 enrolled schools, the Paryavaran Mitra Programme is a call for active participation in the nationwide movement towards strengthening sustainability education at school level.

Keywords: *Environmental Education, Project Based Learning, Education for Sustainable Development, Action Projects*

D7

Aalborg UNESCO Certificate: Staff Development and Challenges in PBL Training Program

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Abstract

Engineers of the 21st century are not only expected to have basic academic knowledge, but also to require diverse work-related experience and transferable competence (UNESCO, 2017). In response to this requirement, active learning methodologies have been proposed and implemented in engineering education in order to train future engineers with professional knowledge and transferable skills. As one core active learning methodology, problem- and project-based Learning (PBL) has been widely adopted in engineering education during the last 40 years because of its effectiveness in improving students' academic knowledge, teamwork skills, communication skills and leadership (Edström and Kolmos, 2014; Han et al., 2015). However, in a PBL environment, not only students but also engineering staff have faced the challenges of transferring their learning/teaching practice from traditional methods to innovative PBL strategies. Engineering staff was reported that they lack PBL theoretical knowledge, facilitation skills, and effective assessment methods in PBL environment (Bani-Hani, et al., 2018; Santos, et al., 2012). Therefore, in order to improve PBL implementation and promote curriculum change processes, it's important to provide PBL pedagogical training opportunities for engineering staff. In collaboration with the Northeastern University (China), the Aalborg UNESCO Centre set up a half-year certificate program (equivalent to 5 credits in the European Credit Transfer and Accumulation System [ECTS]) on the *Basics of PBL and Curriculum Change* for academic staff development. The course is based on PBL principles and aims not only to train participants in PBL skills, but also to contribute to academic staff learning and practice change. In this program, seven participants from different engineering-related subjects at the Northeastern University joined a half year training program with both workshops about PBL pedagogy and practice, and a team-based project on implementation of PBL curriculum design for their own institution. Through the training program, participants were expected to obtain PBL theoretical knowledge, improve their facilitation skills and develop initial PBL design for a course or an institution. In order to have deeper understanding of the effectiveness of PBL pedagogical training program, this research will answer the following questions: what are the experienced learning outcomes for engineering staff in the PBL pedagogical training program? What are the main challenges participants meet in the PBL pedagogical training program? Using a qualitative method, two-round semi-structured interviews were conducted on six participants at the mid and end of the training program, which is aimed to track the development of participants' learning outcomes through the half-year program. This paper presents participants' development of pedagogical knowledge, PBL skills, teaching attitudes and thinking styles through PBL pedagogical training based on comparison between mid-term and post-program interview. The results indicate that the participants reported they had gained pedagogical knowledge, such as PBL history, principles and models, and improved their lecture skills and facilitation skills. Their interest in teaching practice and innovation was also found to be enhanced by joining in the design of PBL curriculum. Comparing data from two-round interview, we found that participants, who mainly focused on issues in individual learning process, have developed a broader view and deeper understanding of PBL implementation in their institution. Through half-year training, they began to accept and understand

different points of view and relevance of focus on not only engineering content but also learning theories to innovate curriculum and implement. Moreover, challenges such as conflicts in group discussion, language barriers for non-native speakers, working with group members with diverse background, how to combine PBL with Chinese culture will be reported in this paper. Suggestions will also be proposed to optimize PBL training programs for engineering staff and promote curriculum change processes.

Keywords: PBL; Staff training and development; Challenges; Curriculum change

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D8

SDGs and Education-A Perspective towards achieving SDGs

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ABSTRACT:
Education is fundamental to any kind of development that the world undergoes. It can create a considerable impact on the society by shaping a student's behavior at the learning age which perhaps influences their decision making. Any kind of development demands knowledge and strategies to be in place which can be influenced by significant education about the issue. On the similar lines, if we look at the concept of sustainable development that is practiced worldwide, a better understanding of the Sustainable development goals, issues and challenges around which these goals revolve can perhaps accelerate the achievement of the 17 SDGs.

Besides being a parameter for measuring a country's development, education also stands to be a tool that infuses discipline in a student's life while shaping their perspective of looking at the world. Presently, more knowledge exists in the world than ever before, but the irony is that not everyone can benefit from it still. Globally, countries have remarkably increased access to education at all levels while also increasing enrolment rates in schools. It is interesting to note that basic literacy skills have improved tremendously over past few years. According to a study, literacy among youth aged 15-24 has improved globally between 1990 and 2016, increasing from 83.2% it has gone up to 91.4%. Incessant improvements in literacy levels across world can perhaps lay a foundation stone to sustainable development because quality education forms the basis of sustainable development, and therefore can accelerate the achievement of Sustainable Development Goals.

The concept of Education on sustainable development (ESD) can play a major role in defining a student's actions and behaviors towards betterment of the environment socially as well as in economic terms. In other words, ESD can act as a tool that facilitates learning on environment issues. It also aims to educate people, empower and prepare current and future generations to meet their needs using a balanced approach towards the economic, social and environmental dimensions of sustainable development. According to UNESCO 'Education for Sustainable Development (ESD)' empowers people to change the way they think and work towards a sustainable future.

In other words, Education on Sustainable Development (ESD) is a tool that encourages changes in knowledge, skills, values and attitudes to enable a more sustainable society for all. It addresses sustainable development issues, which are not only environmental problems, but also are social and economic. It is conceivable that, students who are educated to be active learners of environment conservation since their childhood can later become responsible participants in their communities who participate in the activities towards achieving sustainable development.

It can perhaps be accepted that education has a strong influence on sustainable development processes and a lack of education and knowledge on Sustainable development and issues associated with it will lead

to lower developmental activities. Consequently, to work towards sustainable development it is imperative that there is significant knowledge about the issues to be addressed to students which can only come through an access to education on environment and sustainable development.

One of the SDGs i.e. SDG 4 which states 'Ensure inclusive and equitable quality education' aims at achieving inclusive and quality education for all and reaffirms the belief that education is one of the most powerful and proven vehicles for sustainable development.

SDG 4 has a list of targets to be achieved by 2030, out of which one is: "*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 non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development*."
This perhaps means that besides achieving SDG4, to achieve all other 16 SDGs it is important to identify and understand how education can play an eminent role in accelerating their attainment. It is ardent to recognize the connections of each SDG with education. This article tries to present a perspective on how ESD can play a major role in achievement of a sustainable future. It tries to highlight how each Sustainable Development Goal fits under the wide umbrella of education and consequently how education overshadows the successful achievement of a Sustainable future.

Keywords: Sustainable Development, Education, Knowledge, SDG 4

D9

Heart and soil: First year stories from a learning garden in the Dubai desert

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Abstract

This auto-criticism essay examines the experience of creating an international school dedicated to education for sustainability in the middle of Dubai. The Arbor School curriculum and pedagogy, unique to the MENA region, is entirely built upon a framework of education for sustainability and ecological literacy and implemented through project-based learning. This paper describes and evaluates the experiences of the Director of Education for Sustainability during the inaugural year of the school through a series of vignettes set in and around the Learning Garden. Using an arts-based approach, this paper explores the following questions: How are we shaped by, and how do we shape, the land on which we teach, live and learn? How do we create an oasis of ecological education in the middle of a sandy construction site? How do we ground ourselves in place when we've only just arrived? Major themes and implications for sustainability education, with an eye towards teacher education and curriculum design, are presented.

Key words: ecological literacy, curriculum and instruction, place-based education

D10

Engaging with New Zealand curriculum & SDGs in pre-service teacher education: Self-study of a teacher educator responding to perceived gaps in sustainability education

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As a United Nations member state, the New Zealand education system has an obligation to include the Sustainable Development Goals (SDGs) in local curriculum design and programmes of learning. Currently the New Zealand Ministry of Education is not formally engaging with the Goals, however education for sustainability (EfS) and environmental education for sustainability (EEfS) are evident in New Zealand primary schools. Schools and teachers are able to draw on expertise from non-governmental organisations, regional councils and resources shared online to support sustainability education, however a mandated framework is not apparent or used in New Zealand. The New Zealand Curriculum (Ministry of Education, 2007) provides an enabling framework for teachers to develop the attributes of Global Citizenship and Education for Sustainability (EfS as sustainability education is termed in New Zealand) and there is a wealth of EfS information available to New Zealand schools, yet work by Bolstad, Joyce and Hipkins (2015) suggests this information is not being used in practice. In New Zealand a number of factors have been identified that inhibit teachers from planning and integrating sustainability into their classroom programmes, including teachers' knowledge and confidence, access to EfS support and resources, and the value and priority teachers place on EfS (Bolstad, Joyce & Hipkins, 2015). Ideally, EfS pedagogy is part of an holistic approach to thinking about the future through the cognitive, socio-emotional and behavioural domains, integrating knowledge, values and skills and seeking to move from teacher-centred to student-centred learning and collective action. It involves a shift from head knowledge and understanding about sustainability issues, to also include the related attitudes and values that influence action: a drive to do something about the issues (Singleton, 2015; UNESCO, 2017; UNESCO, 2012). As a response to the perceived needs, a course: *Education for a Sustainable Future* was developed and included in the B.Ed. (Teaching) Primary degree for third year pre-service student teachers at a private tertiary institute in 2013. The course, now renamed to, *Stewardship & Sustainability in Global and Local Contexts* provides students with opportunities to explore and critique ways of living sustainably, link their understanding to the curriculum learning areas, with a particular focus on Science, Technology, Social Sciences & Health and develop, articulate and justify a rationale for educating students for a sustainable future, while also identifying the practical implications of this.

An integral component of the course is the introduction and application of the SDGs in both learning and teaching. Additionally, current publications supporting sustainability pedagogy, including frameworks and learning objectives, have been instrumental in further course development as have students' pre-course thinking and post-course evaluations. These have affirmed the necessity of students working to meaningfully integrate the SDGs into curriculum learning using a head, heart and hands model. The head, heart and hands model encourages students towards action-competence through planned learning in the cognitive, socio-emotional and behavioural domains. The model was integrated into the student teacher planning component of the course after a common trend among student teachers was noticed during analysis of their understanding of sustainability education. A focus of this paper presentation is the

outworking of the head, heart and hands model, sharing examples of student teacher planning and some of the challenges students faced in terms of teaching children from these unit plans. The educator's course development over the last seven years has been guided by a genuine investigation into student teachers' understanding of sustainability and the resultant growth in personal and professional understanding of sustainability pedagogy. Therefore, an overview of student teachers' critical reflection and evaluation of the teaching and learning experiences from the course, including areas for further development within the course and Primary B.Ed. Programme, will also be highlighted during the presentation.

Key words: pre-service teachers, curriculum, sustainability pedagogy

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D11

Loose Threads: Teacher's training for sustainable development education

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When one talks of sustainable development, we do hear that its not given much attention to at schools and colleges, or not included in the curriculum, mainly due to academic mandates and lack of sufficient space within the curriculum. What we tend to ignore is how much capable our staff is, not just to teach students about sustainable development but imbibe in them the ethics and the importance of it.

More often than not, the staff who teaches is not equipped with sufficient knowledge and research to be able to teach students. There's a substantial lack of awareness in sustainable development within the staff members. When a practical subject like sustainability is taught, the students see them as role models so they should be one and not act like one. Only a person practicing it their own lives should teach it even its practising not that aspect but certain other aspects.
Why the sustainable education of the teacher is important for students's sustainable education? This paper answers the question through the use of real-life-examples. It draws on, through the use of small case studies, on different ways in which teachers are handling the issue stated above, 'a sustainability quotient' being an important parameter to measure a faculty member's sustainability awareness. Being in academics since the past few years, and having sustainability as an important part of our module, I have carefully observed how students learn; when do the students carry forward their learning of sustainability; when and how they imbibe it in a more holistic way - in their design practices and their daily lifestyles as well. I have analysed and incorporated these findings in the research paper. The paper also provide areas and ways of improvement - on how teachers' training could be better developed, through exposure to industry design practices, working on specific research projects, speaking and participating in conferences.

Keywords: sustainable development, sustainability quotient, teacher's training

D12

Sustainability Education In The School Education System

Case Study & Curriculum

A Vision Of Sustainable World Through The Lens Of A School

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AIM:
This activity enabled the students to:
• appreciate and design sustainable environmental models.
• communicate ideas regarding the use of sustainable technology and suggest ways to clean up our environment.
• create awareness about sustainable tourism in various countries.
• develop team spirit.

With an objective of 'Malnutrition Management through a Plantation Drive', St. Mary's School, Dwarka joined WEPLANT's 'Million Seed Campaign' in the month of April.
An orientation session on 'How to Save Seeds', was conducted by our Principal Mrs. Sheelu Mathew and Rev. Santosh George from We Plant at St. Mary's School, Dwarka on 18th April 2017. The students of our school collected seeds like mango, tamarind and lemon, this summer. These seeds were collected by Rev. Santosh of the WePlant organization and were used to plant fruit tree this monsoon. A nursery was set up in St. Mary's School, by our students and the volunteers from Holland and Australia. The students planted saplings in the school botanical garden 'Botanica'.
The partner school in Lebanon initiated a similar plantation drive 'Go Green'. Various activities were conducted by their students. Photographs were shared through e mails, by both schools.
Topic: Need of the environment

Standard	Activities
Class I	Coloured a 'Smiling Earth' with the message 'always keep your surroundings clean'
Class II	Coloured a scenery, in which they identified and labelled different living and non-living components
Class III	Prepared masks of endangered species on the theme 'Save Animals'

Topic: Biomes
Activity: Cut outs of the flora, fauna and food chains of the given biomes.

Standard	Type
Class IV	Created mountain and plain biomes.
Class V	Created forest, desert and ocean biomes

The students then created and showcased beautiful sustainable environments in their respective classrooms on the PTM held on 22nd July,2018. The parents applauded the efforts of the students and were highly impressed by the spectacular show of their talent.

A talk show was organised on 17th May 2017, on the topic' Our Sustainable World'. Dr. V. A. V. Raman and Dr. Krishnanand Jha, Professors of the Department of Geography from University of Delhi, interacted with the students of the middle school on the immediate environmental concerns. The talk was both informative and interesting.

St. Mary's School, Dwarka organized the Open Day on 19th August 2017. The theme for this academic session for classes VI-VIII was 'Let's Clean Up the World'. The students studied sustainable technologies that can be used to clean up the oceans, mountains, the Arctic and Antarctica. The students subsequently presented their findings in the form of models, display boards, scientific reports and charts. Blogs written by the students were also uploaded.

In our endeavour to promote sustainable tourism, an Inter House AD-MAD competition was organized on 3rd May 2018, with the theme 'Sustainable Development of Tourism in the World'. Prior to the competition, the students of all the four houses promoted their service by advertising on posters, conducting street plays at different venues within the school and created awareness about the need for the same on social media. On the day of the competition, the students of Aastha house showcased the culture of Egypt and how sustainable tourism is being promoted through extensive recycling of paper bags.

Photographs and videos of the competition were shared with our partner school through emails and we received applauding remarks from their students. This activity was also shared on Facebook, Twitter and YouTube.

A collaborative activity was conducted between the partner schools, to promote sustainable tourism which aimed at encouraging students to appreciate and understand the importance of conservation of popular tourist landmarks in the students. Power Point Presentations of tourist places of Lebanon and historical monuments of Delhi were prepared and shared by the students of Lebanon and India respectively.

OUTCOME:

The activities enabled the students to: -

• understand the importance of planting trees and how each one of us can contribute towards making this world a better place to live.

• explore, investigate, and present the different biomes.

• comprehend and communicate how sustainable ways and technologies can save the world from further damage.

• Spread awareness about sustainable development of tourism and the need to promote it.

• imagine, create, present and develop scientific temperament in addition to team spirit.

TEACHER'S TRAINING

ORIENTATION OF THE TEACHERS

A. WEPLANT-Teachers attended a workshop organised by Rev. Santosh George V from We Plant 'Million Seed Campaign'. The learnings were incorporated in Eco Club and environmental activities under SEWA

B. The Climate reality project- Mr. Aditya Pundir- Country Manager conducted teacher's workshop in school about combating climate change followed by online teacher training programme.

C. Ms. Seema Bali, Vice Principal, St. Mary's guided the teachers extensively about the modus operandi of the project.

BRAIN STORMING (SECTION WISE)- Section wise teachers had a detailed discussion with Ms. Seema Bali , incharge of the project, and Head of the department for Science.
DESSEMINATION OF INFORMATION TO THE STUDENTS- The result of the above discussion and the project design and model was disseminated to the students by the teachers.
EXECUTION AND IMPLEMENTATION OF THE OUTCOME-
SHOWCASING OF THE CLASS WISE EXHIBIT FOR PARENTS
BLOGS BY STUDENTS

https://www.facebook.com/notes/st-marys-school-dwarka-isa-projects/changing-arctic-by-arush-jha-std-viii/838348053010303/
https://www.facebook.com/notes/st-marys-school-dwarka-isa-projects/protect-our-otherland-bhavya-rana-std-viiib/831421100369665/
https://www.facebook.com/notes/st-marys-school-dwarka-isa-projects/clean-up-oceans-yashita-matlani-std-viii/838344169677358/
https://www.facebook.com/stmarysdwarkaISA2017/photos/a.363585347153245.1073741827.355239457987834/779295032248939/?type=3&theater

YOUTUBE

https://www.youtube.com/watch?v=EZJfVPWR4Ss
https://www.youtube.com/watch?v=ZYFNkoGxG90
https://www.youtube.com/watch?v=VLVePuoZuB8

LIVE STREAMING

https://www.facebook.com/stmarysschool.dwarka.1

D13

Student Agency and Learning for Sustainability

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Key Course and Pedagogical Attributes

Human agency (see Bandura, 2006; Mayr, 2012) is at the core of education and building resilience while preparing the next generation for the social, economic and environmental changes (Commonwealth Secretariat, 2017; UNESCO, 2017). It is important to understand human agency in the context of curriculum and pedagogy and building the necessary knowledge, skills, values, attitudes and competencies (de Haan, 2010; Rieckmann, 2012; Wiek et al., 2011) associated with sustainability (UNESCO 2017). This study investigated the impacts of sustainability-oriented courses on students' awareness and actions. Through an in-depth qualitative analysis that provides students' views on their own learning, this study examined students' understanding of sustainability concepts and how they implement the strategies they learned in these courses. Key research question that guided this study was: What are the key course content and pedagogical attributes that influence student views, awareness, and actions toward sustainability?

Theoretical Framework:

The study employs behavioural change theories, including socialcognitive theory (Bandura, 2001) and trans-theoretical theory (Prochaska & DiClemente (1986) to interpret and understand the impact of the courses on student participants. According to these theories both personal interaction and environment play a crucial role in the learning process and they attempt to explain how individual behaviour change and patterns occur. These theories provide an interpretive lens to understand the study's results and explain them in terms that identify how sustainability curricula could work towards cultivating human agency.

Methods:

The research question was examined using a qualitative collaborative research approach (Corbin & Strauss, 2008; Denzin & Lincoln, 2008; Palys & Atchison 2008); using focus groups, inclass observations, and interviews. Focus groups were conducted mid-semester and were meant to provide the preliminary base data to help guide interview questions. The interview questions were developed using an interpretive and descriptive approach in order to investigate the concepts and personal rationale of each student. The study included 3 sustainability-focused courses at the University of British Columbia (UBC). A total of 13 students, 3 instructors, the Associate Director of the Teaching and Learning Office, and the Director of the UBC Sustainability Initiative were interviewed. These methods sought to procure a more in-depth study and investigation of students' understanding, conceptions, and behaviours.

Results

A set of pedagogical attributes and course characteristics were identified that students valued and believed needed to be included in a course about sustainability to make that course useful and credible: Scientific Background, Multidisciplinary and Holistic Understanding, Current research

and technological innovations, Strategies and resources for making change, Project-based Student Discussions, and Links between theory and practice through practical applications. In addition, student participants identified six central characteristics, as key to providing an overall knowledge and in-depth exploration of sustainability. These are: 1) Introduction to the scientific basis of climate change, 2) Presentation of mitigation and adaptation strategies, 3) Involvement of students in group and/or project work, 4) Information about technological innovations and advancements related to the issue, 5) Discussion of the history and background of the sustainability issue, and 6) Critical examination of sustainability issues through guest lectures, multidisciplinary group discussions and seminars. Based on interviews with the course instructors, the same six course characteristics were identified as representing what instructors regarded as important for promoting student understanding and application of sustainability concepts.

Conclusions:

Sustainability-oriented courses can influence student attitudes towards and their motivation for, continuing to focus on sustainability in their education, career plans and lives in three major ways:

1. Participating in sustainability-focused courses can lead to positive changes in students' views and attitude about sustainability
2. Participating in sustainability-focused courses can motivate and inspire student involvement in sustainability
3. Experiencing different approaches to the teaching of sustainability promote different responses to and understanding of issues.

This study shows how and whether sustainability-oriented courses are impacting students' conceptions of sustainability concerns and therefore enhancing their human agency toward such issues. The results of the study provide a framework for the adaptation and further modification and development of the sustainability curriculum at UBC and beyond; by understanding how students learn and integrate these strategies into their everyday lives so that we can adapt our teaching and pedagogy accordingly. In addition, it also provides an evaluation of the effectiveness of long-term sustainability impacts of the three courses studied and suggests additional evaluation of other similar courses at UBC.

This research also raises some broader questions regarding the issue of sustainability education: questions such as "how can we understand and cultivate human agency in the conceptualization, interpretation, and application of the 2030 Sustainable Development Goals (UN, 2015)? and "how do students operationalize sustainability competencies toward social change? This study is now the basis of a PhD research program to explore and investigate how do students in urban settings conceptualize and apply the knowledge, skills, and competencies associated with sustainability to real-world complex problem solving and for innovative leadership?

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ABSTRACTS

D14

Contextualization of Education for Environmental Sustainability: Exploring the Perspectives and Experiences of Pre-service Teachers Living in NCT-Delhi

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Contextualization of Education for Environmental Sustainability: Exploring the Perspectives and Experiences of Pre-service Teachers Living in NCT-Delhi

The philosophical discourse on environment (across the world and in India too) has time and again emphasized on the salience of Environment and its conservation for its intrinsic as well as instrumental value. Moreover, there has been the visibility of various environmental concerns in the various national and international policy initiatives, documents and landmarks (such as MDGs, SDGs, National Five Year Plan, Article 48-A and Article 51-A of The Constitution of India). It is in this regard, **Environmental education** has also (co)evolved as a crucial rejoinder to address the contemporary environmental challenges. **Education for Sustainable Development (ESD)**, being the most recent and acclaimed descendant of Environmental Education, aims at creating a well informed, sensitive and active citizenry for an **ecologically sustainable future** thereby improving the quality of both environment and life on Earth. This essence of ESD has also been enshrined and propagated by the **National Curriculum Framework (NCF-2005)** for School Education in India. This document focuses on **Learning about, through and for Environment,** which has great implication for bridging the alienation of learner with his/her immediate environment thereby facilitating efficacy of one's environmental actions.

Further, this contemporary discourse on sustainability lays a great deal of emphasis on the intersection of ecology, economy and society. It is in this backdrop, the present paper also argues that environmental issues are not merely ecological but they have socio-economic and political context too. Similarly, the environmental actions (whether of individual or of a group) are also influenced by these contextual attributes. Hence, the present paper attempts to highlight the need for contextualization of education, owing to the contextual nature of both environmental issues and environmental actions. For this, the present paper explores the perspectives and everyday experiences of Pre-service Teachers who have been living in NCT-Delhi. The paper presents the key findings from a portion of a qualitative research study, which the researcher has conducted during her M.Phil (Education), highlighting the need for the contextualization of Educational Programme for better conceptualization and implementation of the goals of 'Education for Sustainable Development' viz. ESD.

Key Words: Contextualization, Environmental Sustainability and Pre-service Teachers

D15

Sustainable Consumption Practices in Schools: An explanatory study

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Consumption is the end line of all the economic activities that take place throughout the globe and it is an important activity as it helps us sustain by fulfilling our basic needs as well as improve our standard of living. Our consumption choices and demand for goods and services of various kinds gives producers an opportunity to increase profits as well as generate employment opportunities, thus helping the economy grow. The consumer culture is such that it makes us want to buy more to feel good about ourselves and generate value without differentiating the purchasing choice as our want or need. Yet over the years of us becoming a more consumeristic society has caused much harm than good. Chapter 4 of Agenda 21, the action plan for Sustainable Development recognised the unsustainable designs of our production and consumption as a major cause for the deterioration of our environment. It is a matter of grave concern as it not only disrupts the ecological balance by mass extraction of scarce resources but also violates the human rights of many individuals. Similarly, it is only one segment of the population who can fulfil their basic needs while the others are unable to satisfy theirs. Over the years unsustainable consumption and production have increased in large numbers in developing countries with the availability of cheap goods which generates tonnes of waste each year.

Education for Sustainable Development (ESD) is considered a holistic and transformational educational type that enables people to live sustainably by educating them to make conscious and informed choices and commit to responsible actions towards the environment and economy for a just society. Sustainable Development Goal (SDG) 12 - Responsible Consumption and Production is an important SDG which aims to ensure sustainable consumption and production (SCP) and education is crucial to achieving this goal. It is only with education will individuals be able to make informed consumer choices and change behaviours towards leading a sustainable life. As growing individuals, children are to be taught about consumption not just in theory but in practice as well as they are the future who will bear the grave consequences of unsustainable consumption and production choices. Though teaching sustainable consumption is the need of the hour most of the schools throughout the globe do not include them in their teaching pedagogy and curriculum. Children, being largely affected by the consumer culture and peer pressure are the present of the consumeristic society and future producers and consumers. It is the need of the hour to ensure their awareness of their consumer choices and the things they are using in their daily life.

This study is based on Sustainable Development Goal 12 - Responsible Consumption and Production with respect to responsible consumption among children of the age of 13 - 18 years and teachers. The purpose of the study is to find out the awareness of sustainable consumption among children and teachers, the teaching pedagogy used by schools to ensure behavioural change towards sustainable consumerism and the sustainable consumer practices by schools such as waste disposal and plastic consumption. The study is focused in the City of Chennai, the state capital of Tamil Nadu, India and the respondents are children and teachers of a private school and a government school with a sample size of 40 children and 10 teachers.

D16

Teaching performance of school teachers of some selected secondary schools in Sadar, Mymensingh, Bangladesh

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Abstract
Evaluation of teaching performances are a large factor regarding learning outcome, student retention, faculty retention, time, classroom environment and salary in developing country like Bangladesh. To evaluate the teaching performance of secondary school teachers classroom observation was conducted with structure questionnaire was done during January to June, 2019. Data about 50 teachers were randomly collected from different schools of Sadar upazila, Mymensingh, Bangladesh. Teaching performance scores of the teachers range from 25 to 87 (mean=62). 9 percent teachers had excellent (≥90) while 25 percent had good (80-89), 21 percent had moderate performance (70-79) while 45 percent teacher performance were not satisfactory (≤69). Attributes such as using of lesson plan, teaching aids and classroom management capability showed positive association in teaching performance. Among the excellent performing teachers all of the teachers with science background while most of the poor performing teachers with social science background. Five attributes such as, place of obtaining degree, highest degrees obtained, service length, their level of job and economic solvency showed no association with teaching performance.

Keywords: Teacher, Performance, Secondary school

D17

Sustainability Education In The School Education System Of India Via Post Structuralism

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Education standards all around the world is always a topic of discussion as every country tries to match up to countries are facing a huge challenge in terms of education as these countries face a lot of issues such as shortage trained teachers, etc.
India has one of the largest higher education systems in the world. However, certain amendments are required Govt. schools.

Programs such as Sarva Shiksha Abhiyan and other government initiatives in India have traditionally been focused of education has been fairly successful in India, with a 96% enrolment rate at primary level (ASER 2012). However, enrollment rate goes down significantly by the end of the secondary level. The reasons stated by recent studies any reforms in education policies in India. Students, especially in elementary education, hardly learn anything. subjects. In fact, the curriculum proposed by NCERT remains same for almost 30-40 years. So, there is an urgency education which require reforms in teacher training, improvements in the facilities in schools, change in curriculum voice to the SUBALTERN so that they would be having equal opportunities which would pave a way for economic the oppressed subjects or more generally those "of inferior rank" . She goes on to add that "In the context of colonial cannot speak, the subaltern as female is even more deeply in shadow". Under this category, it includes transgender, important to come up with an education system where no gender is biased in this cultural context and people.

Q HOW WOULD THIS GOAL BE ACHIEVED?
Post structuralism theory which question the legitmacy of understanding and interrogating the production of contextual knowledge or truth. Within poststructuralism, discourse is conceived as a set of beliefs and understandings, reinforced particular understanding of the ways we are in the world (Weedon, 2004). Discourse isnotspecifically a language practices.Language practices produce shared cultural narratives, or discourses, which are "'historically, socially, statements,terms, categories, and beliefs,'" that organize the ways in which we can think and act (Scott, 1988, challenge the normative concepts exist in an education system and that would come only when critical and independent the following ways:

- Through the medium of writing and instruction
- Feminist perspective of children literature i.e fairy tales
- Kooperatives Lernen
- Genderéquity policy
- Composition pedagogy
- Gender training pedagogy

Through this project, I am striving young, inquisitive minds to be critical, independent thinkers that will prove country as a whole. Up till now, teachers taught their students with banking approach filling up

their minds merely with facts and dates, in order to achieve good marks. Most of the Indian children lack also leadership qualities as back in colonialism era; Indian people are generally doing blue collar jobs for British govt. This mindset for not taking a risk or not pursuing their goals needs to be changed in order to contribute equality and economic development.

AIM:

To develop a policy framework of reform pedagogy focusing on sustainable education and interdisciplinary approach in teaching in schools and owing to limited budget allocation and lack of awareness suggestions and frameworks would be made to improve the delivery mechanism and creating standard curriculum learning

D18

Creating Future Generation's Organic Foundation:

exploring models of holistic regenerative sustainability education

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Abstract

Holistic quality education is imperative. It lays a strong sentimentally governed and ideologically driven foundation for future creators, and managers to explore myriad of ways in which sustainability could be defined and interpreted. This paper focuses on understanding the various models of sustainability education. It does a cross comparison of methodologies to integrate sustainability features and to be future ready. Furthermore, the paper analyses organic construction techniques, and materials. It looks at the effectiveness of school based curriculum in building a culture of organic and harmonious living. Drawing on existing literature, and public statistics This paper explores various methods of regenerative construction of public and private spaces with organic, locally available materials as an alternative, sustainable solution. It evaluates the impact of heat island affect of organic construction materials: examines the cost-to-benefit ratio of climate change adaptable materials. The study further explores the availability and Pareto optimality of natural resources extraction i.e. the locally available resources. Finally, this paper appraises the various existing school and/or non-academic curriculums on carbon neutrality, eco-friendly education, green mentoring programs, organic living, green education etc. An in-depth analysis of the validity and effectiveness of such programs, and the impact it has on immediate and broader surroundings revealed, that purely theoretical programs have had little or no significant impact on the students. Therefore this study extends to recommend an intensive practical and interactive curriculums that covers the global realities of climate change and the imperative for sustainable solutions through various traditional methods i.e. story telling, mud stomping, value education, enquiry learning, learning by doing, learning through music and dance. A communal approach is advocated in accepting the challenge of reorienting mainstream school curriculums to include a holistic approach to education, ipso facto sustainability in Education.

Keywords: Climate change adaptation, local resources, traditional skills, sustainable education, green education, sustainability education.

D19

Gardens as Learning Labs in Schools

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Environment Education is an important aspect of development of child‟s approach towards conservation and understanding long lasting impact of human activities on environment. An interactive tool to make child understand and visualise nature in day to day life leaves an impact on child's imagination and understanding. This case study is based on a yearlong project "LifeLab Gardens" in a community school in Ahmedabad. The rooftop garden is used as an interactive space to conduct workshops, conduct experiments and help children observe the developing of ecosystems in a garden. The workshops conducted are aligned with the primary school curriculum and with defined end goal objectives. Schools and communities in urban environment lacks dedicated natural spaces for children to freely experiment and learn various aspect of inter-dependence in nature.

This case study also includes a detailed analysis of impact of the Garden based learning on children's mind set and their actions further in community. A detailed plan for yearlong workshops aligned with current „The National Council of Educational Research and Training (NCERT)‟ has been studied and analysed in this case study. The case study also includes various innovative ideas to include such spaces according to different school demands and space available. A detailed development plan has also been studied to teach sustainability to primary school children.

Keywords: Environment, Sustainability, Garden

THEME E - Sustainability Education within the National Education Policies

E1

A study on Perception of teachers regarding Sustainability Education within the National education Policy 2019 in Chennai

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Education is essential for development and has a critical role to play in achieving the Sustainable Development Goals (SDGs). The Sustainable Development Goals lists down 17 different broad goals for every country to achieve the path of development. These SDGs also have some drawbacks as it has not specified the limits or the kind of quality services that should be delivered for different countries. But these are considered as a basic layout to start the march on the path development. As per the 2016 UNESCO Global Education Monitoring Report, educating more and more is the only way of eradicating poverty, hunger, provide people with basic health facilities, in achieving gender equality and much more. In other words, education is the key to more inclusive societies. Education is the central answer to all the 17 Sustainable Development Goals.

"The National Education Policy, 2019 envisions an India centred education system that contributes directly to transforming our nation sustainability into an equitable and vibrant knowledge society, by providing high quality education for all." Education for Sustainable Development (ESD) mainly focuses on the learning needed to maintain and improve the quality of life of generations to come. It is about preparing for the world in which we live in the next century so that there is no crisis. Sustainable Education is to equip individuals, communities, groups, business and governments to line and act sustainably.

Hence this study is to assess the knowledge of teachers regarding sustainable development education, its importance and inclusion in school curriculum with respect to National Education Policy, 2019. Since, teachers play an integral role in knowledge facilitation process of children and influence their awareness levels. To understand the perception of teachers regarding sustainability education and their opinion about the inclusion and importance of it in a student's life the information was collected by the schools teachers and principals with the help of different data tools. This study is restricted to Chennai, the state capital of Tamil Nadu and the respondents are school teachers from government and private schools.

E2

Analysis of India's National Curriculum Framework for Teacher Education with respect to Education for Sustainable Development

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ABSTRACT:

In the name of modern development, our actions are leading us into the blackhole of the humanitarian crisis where the sustainability of life on mother Earth is in the question Our actions are the result of our thinking, which is dependent on the education system we are using to create it. Education, as accepted worldwide, is the most powerful tool for guiding us towards a sustainable future in which it is recognised that our teachers, our *gurus*, who nurture the younger generation plays a crucial role. However, despite international and national consensus on the importance of the role of a teacher to achieve a sustainable future, this area is yet to be introduced consistently and coherently into pre- service teacher education in India.

With the emergence of the draft of new National Education Policy of India after almost three decades, it can be presumed that huge educational transformation is underway. At this juncture, it becomes all the more important to analyse policies of the past critically so that the new policies cater for the deficiencies of the old ones. The absence of analysis of the old policies just leads to repetition of issues, concerns, solutions which means offering of the same old things but in a new package. The teacher education curriculum can be regarded as the backbone of any educational system as it directly influences in the making of a teacher who is responsible for shaping the destiny of the mankind from their classrooms. A teacher is a ray of hope who can stop this unsustainable journey of development; therefore, it is urgent to empower our teachers through appropriate knowledge, skills and values so that they can prepare their students to accept and embrace the uncertainties of tomorrow gracefully.

Within this context, the present study aims to analyse India's most recent teacher education curriculum framework i.e. National Curriculum Framework for Teacher Education (NCFTE) :2009 with respect to education for sustainable development (ESD). An additional motivation for analysing this document with respect to ESD is the mention of the word humane on the cover page of the document as a tagline of the title which states, "Towards Preparing Professional and Humane Teacher" and the recognition by the document to reform the teacher education through," perspectives for equitable and sustainable development".

A qualitative deductive content analysis methodology was adopted for the present study. Therefore, a self-developed codebook was formulated based on UNESCO's Teaching and Learning for a Sustainable Future (TLSF) programme. The codebook developed was based on knowledge, skills and values (KSV)framework , which analysed NCFTE:2009 in terms of three categories which were further divided into sub-categories and indicators . Category 1 comprised of knowledge with four sub-categories: economic sustainability, environmental sustainability, social sustainability and cultural sustainability. Category 2 comprised of skills with two sub-categories: teaching-learning skills and assessment skills. Category 3 comprised of values with three sub-categories: social-justice values, conservation values and global value of interrelatedness. Each sub-category was further discussed on the basis of the indicators as mentioned in the UNESCO TLSF programme. The overall findings suggested that NCFTE:2009 to a certain extent has a potential of integrating the components of ESD in the teacher education programme. It can be inferred from the codes generated as a result of content analysis , that skill category was strongly rooted , followed by the knowledge and value categories which emerged as moderately rooted with respect to ESD .Further, it was found that there is an absence of latent or manifest content for the indicators like responsible tourism , population growth and rapid urbanisation. It was concerning to note that there was a rare presence of the issues like climate change, future problem solving and inter-species equity.

It becomes apparent from the analysis that there is a need for a new teacher education curriculum framework which conceptualises the idea of sustainable development comprehensively in the pre-service and in-service teacher education programmes, and is aligned directly with the sustainable development goals(SDG's) ,which will empower the teachers to advocate the actions, the ideas of their students for the attainment of a sustainable future.

Key words: Education for sustainable development, teacher education programme, curriculum framework, content analysis

E3

Towards a holistic approach to National Education Policy through education for sustainable development

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Sustainable development concerns with the judicious consumption of resources keeping the needs of the future generations in mind. Education is the most effective tool to influence, mould and nurture individuals of the forthcoming generations that will inherit a world with limited natural resources.
Educational policy reform is central to the integration of sustainability aspects in our evolving pedagogy. The draft National Educational Policy (NEP) was crafted recently in 2019 'to ensure it touches our life, consistent with our ability to contribute to many growing developmental imperatives of our country on the one hand, and towards creating a just and equitable society on the other.' The policy draws on cultural heritage and 'injection of liberal education ethos' to advocate for inter-disciplinary interaction to address subjects of social importance including clean water, energy, environmental sustainability, gender equality, preservation of endangered languages and preservation of local arts.

Three years into the United Nations 2030 Agenda for Sustainable Development, we are witnessing decisive commitment and transformational progress towards its achievement. The concept of ESD (Education for Sustainable Development) has assumed prominence after the strong emphasis placed on education as an enabler. Sustainable development literacy can be measured in terms of acquiring a set of critical skills, to provide a sound framework for education (Newman and Dale, 2005). The SDG 4 has been identified as one of the 17 Sustainable Development Goals (SDG) with the objective to 'ensure that all learners acquire knowledge and skills needed to promote sustainable development through education for sustainable development, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development'.

This paper deals with the twinning of SDG related targets and objectives with the key components of the National Education Policy (NEP) to understand the lacunae in the policy framework. The key social aspects including primary education quality, gender equality in access to education, addressing nutritional and vocational enhancement through education, leveraging Information Communication Technology (ICT) have found significance in the policy which is indeed a welcome development. But some of the other key aspects including the integration of sustainability education in the curriculum, environmental awareness and climate change, energy access and biodiversity preservation will need to be inducted into the pedagogical structure to ensure that India can realise its commitment to meeting SDG's targets.

The key objectives of the paper are:

- To review the global best practices in the area of environmental education policy to enrich sustainable education in the Indian policy framework.
- To assess the National Education Policy in the context of the goals and targets of the SDGs to identify gaps and provide suggestions to address them.

- To identify the potential SDGs that have a strong relationship with education, and thus to explore the most significant of them that can support us to achieve global agenda by 2030.
- To map the key SDG goals to the objectives of the NEPs to determine how effective our new educational policy would be to achieve SDGs and targets.
- To suggest curricular reform measures in our school and higher education frameworks to include the sustainable development parameters (Economic, Social and Environmental) in the pedagogical structure.

In short, we hope to provide policy suggestions to curricula developers and policy practitioners to improve the draft educational policy by including all aspects of sustainable development. The findings and policy implications of this paper will demonstrate that development and reform in education can accelerate and support the progress of SDGs agenda

E4

Education for Sustainability: Policy Intervention in India

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ABSTRACT

The 17 sustainable development goals (SDG's) by the UN General Assembly have been formulated to achieve a coherence in the approach to deal with the various social, economical and environmental challenges at the global level to grass root level. The goals deal with a varied spectrum of global challenges and calls for partnership for achieving them. To achieve the goal, the agenda begins to understand and acknowledge the issue and the prominence of the same issues deeply rooted in the values of our societies. A transformation is thus required not just at the policy level but also at the mindset of people to welcome and initiate a change in the perspective and the ways in the which the society works. Climate action, for instance in goal 13 in the Sustainable development goals with the aim to "Take urgent action to combat climate change and its impacts", to achieve the same, it becomes of utmost importance to be aware about the current situation in depth with the root causes and impacts. Thus education, both formal and in formal, becomes crucial.

In the current scenario with cities, in particular Indian cities like Chennai, facing acute water crises, the urgency of adopting a sustainable way of living has, moved from the periphery of our thoughts to the core center of our agenda to survive.

Primary education plays a key role in developing the overall personality of an individual along with the basic idea of responsibilities towards the society. At this stage if the concept of sustainability, which was defined by the by the Brundtland Commission as, " development that meets the needs of the present without compromising the ability of future generations to meet their own needs", is planted in the young minds, a wider benefit to the entire community can be realized. Schools play a pivotal role in bringing this change. What is required today is not just a theoretical understanding of the concept of sustainable development but a practical approach towards problem solving, critical thinking and analytical approach towards the various issues and risks that cities face today along with the attitude and intention to achieve sustainability in all the sectors.

The paper describes the role of education for achieving the targets of the Sustainable development goals along with the various tools and methodologies adopted as best practices including the various policy level interventions in India to promote an ecosystem of sustainability capacity building amongst various levels. India's education policy and the various organization and their roles in the education for sustainable development along with the new schemes like Smart Cities mission, Swatch Bharat mission etc., play a vital role in encouragement of student engagement for sustainable development. The paper discusses the role of the same in the capacity building for sustainable development.

The paper also highlights the integration of technology and innovation in understanding the current situation of global challenges at local level to be able to draw actionable insights which can be developed into solutions at ground level. The paper examines the role of technology in increasing the participation of

multiple stakeholders in the education for sustainability and subsequently actions for the achievement of the same. Recent development of web portals and mobile apps, have led to a paradigm shift in the concept of participation in the development activities and this increased participation has been encouraged by the technological advancement and greater concerns for the biodiversity in the society.

The paper concludes with recommendations, based on the best practices globally, that can be adopted in cities for an enhanced quality of education for sustainable development through encouraging a deeper understanding of the need of actions today.

THEME F - USE OF NEW AND EMERGING TECHNOLOGIES IN SUSTAINABILITY EDUCATION

F1

Sustainability Education in Agriculture: The prospects of Digital Green in India

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Introduction:

Agriculture plays a significant role in the Indian economy. However, the agro based economy of India is severely affected by various reasons like climate variability, water scarcity, extreme weather events, human induced changes in land practices. The problem gets amplified due to the ignorance of the farmers and the technological challenges they face. In such a scenario sustainable innovation in agriculture is of urgent necessity. But often Indian peasants are suffered from lack of awareness about modern and updated agricultural practices. Farmers of remote rural parts of India lack the knowledge base (like knowledge about using machines, buying seeds, marketingtactics). Often they follow the agricultural practices that are practised by others without knowing their effectiveness. They are hardly aware of the latest innovations in the market. Digital Green approach has been designed to fight against such woes.

- How the farmers of low income countries are suffering from the ill effects of lack of awareness about modern and innovative agricultural practices and abstract information base;
- How digital divide affects the peasantry in the remotest corners of the country;
- How Digital Green contributes towards farmer education and imparting knowledge among peasants about innovative practices and how through training process farmers help in establishing innovative agricultural practices;
- The more effectiveness of the Digital Green approach in comparison to conventional agricultural extension services in the South Asian Countries like India;
- The challenges and prospects of Digital Green Approach in India**.**

Methodology:

The study employs descriptive analytical method. It analyses contents of governmental reports, documents, declarations as primary sources and adheres to secondary materials like analytical articles in journals, newspapers, books and relevant websites. On the basis of accumulated information it will provide an comparative analysis also about the more acceptability of Digital Green among farmers of India than traditional methods.

Findings:

- Digital Green is inspired by a number of projects like Information and Communication Technology in agricultural development, video in agricultural extension etc. It combines the best and innovative parts of these projects in order to popularise community engagement and participation throughout the process. It thus works with local farmers to create community-led videos disseminated through local social networks to encourage farmers to adopt new practices to improve their livelihoods. The process includes short spanned, low cost topical videos designed by Community members addressing locally identified challeges with which farmer can connect themselves. Group discussions are held where local intermediataries encourage the targeted masses to interact among themselves about the video contents. The process is followed by the home visits and further discussions in order to ensure successful adoption of promoted practices. Digital Green partners with existing public, private and civil society organizations that work with rural communities. It has been recognized as the national support organization to the Ministry of Rural Developments' National Rural Livelihood Mission. The best part of the working process of the Digital Green is that both the partners and non partners use its videos and technology as it is designed on an open source basis.
- Women are also educated through the process that helps in their economic empowerment and emancipation.
- It is very cost effective in comparison to traditional extension services which use a top-down approach. In sharp contrast to the the latter, Digital Green does the "delivery of information inputs to farmers" following a bottom-up approach where small holder farming communities are at the core and which is designed for community interventions. It actually complements existing linear extension services through video-enabled approach.

- There are some roadblocks in operationalizing the process. India is a large country with a large population. A large chunk of our population is engaged in crop yielding. The number of extension workers per farmer is low here. Lack of local facilitators –one of the major components of the project who may share and pass experiences to other farming group can inhibit the success of the project as a whole. Secondly, India is divided into various climate zones and there also exist differences between rural and urban areas and irrigated and rainfed areas. Sometimes generalized informations have confused the farmers as they may find the contents of the videos as locally irrelevant. Thirdly, the feedback process also requires to be modified. Fourthly, knowledge poverty due to digital divide in rural and peripheral districts of provinces has hindered the progress of the process.

- Despite having some stumbling blocks, Digital Green has catalysed a silent revolution resulting in improved crop yields, increased agricultural skills of the peasants. PM Narendra Modi,s Digital India Mission can help in the process, success to a great extent.

Keywords: Agricultural Extension, Digital Divide,Digital Green, India, Innovation, Sustainability.

F2

Gamification

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One of the most astounding changes in the classroom over the past two decades has been the incredible advances in classroom technology. The decreasing costs of technology have enabled schools to gain access to new technologies, while increases in access to advanced technologies offers classrooms new opportunities to explore different ways to explore and learn about the world. Teaching & Promoting Sustainability through Gamification is one of the recent idea which has been used in various industries.
The heart of a good game is merging the content—which is problems to be solved—with the game mechanic. Using altruistic and gamification principles game called “ecoman” with a motive to generate long-term motivation for students. EcoMan became a way for children to learn about sustainability and saving CO2, how to make better lifestyle choices, and have fun doing it. The game includes a virtual living creature that can only survive as the player makes better choices in consumption and energy. Using their skills and knowledge, children change behaviour to accomplish missions and earn rewards. Kids collaborate and compete as they search and collect treasures.

F3

COMPUSUSTAIN: Handling Sustainability using Computational Intelligence

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Computational sustainability is an expansive field that intends to optimize societal, economic, and environmental resources using techniques from mathematics and computer science at large. It is an interdisciplinary field that aims to apply techniques from computer science, information science, operations research, applied and computational mathematics, and statistics for balancing environmental, economic, and societal needs for sustainable development. It brings together the scientists working in these areas including land use and conservation planners, policy makers and anyone interested in computational sustainability under one umbrella.

Sustainability in this context is the ability to produce enough dynamism for the world to support its biological, mechanical, physical and digital systems. With the inventions and innovations in modern devices and technologies, use of Information and Communication Technology has facilitated the functioning of systems specially designed and developed for this purpose.

Hence, the objective the paper is to propose the computational models and methods for decision making concerning the management and allocation of resources in order to solve some of the most challenging problems related to sustainability. The objective will be achieved by taking up example areas from disaster management, education management, healthcare systems, banking sector, tourism industry, transportation systems, environmental protections, energy saving where the sustainability issues hamper the system stability and growth.

Problems in Multidisciplinary research areas and projects often require fast and intelligent solutions. Computational Intelligence provides the necessary framework for developing intelligent solutions. Computational Intelligence arises out of computational methods inspired from multidisciplinary areas such as Biology (Bioinspired computing, Bioinformatics), Chemistry (Chem-informatics, combinatorial chemistry), Physics (Quantum Computing), Simulation and Mathematical Modelling, Natural Language Processing, Health Care Systems, Social Sciences, Education Technologies. These computational solutions can be applied in combination with the concepts in Computer Science and Information Technology.

The research paper is a modest effort to exhibit how Intelligent Computational Solutions can be used for solving the problems in different domains such as Preparedness and minimizing the impact of disaster situations such as floods and fire, Environmental Protection by reducing the carbon emission on the roads, Education for disabled learners and Healthcare for senior citizens.

Key word: Computational Sustainability, models, multidisciplinary areas, case studies

F4

Case Study: Use Of Mobile App Technology For Mangrove Conservation

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ABSTRACT

Mangrove ecosystem is vital lifeline for coastal states of India. It provides several ecosystem services such as prevention of coastline erosion, climate regulation, carbon sequestration, habitat for biodiversity, livelihoods for coastal community, raw material for domestic and industrial consumption, educational and recreational avenue. However, awareness about it is inadequate because of its swampy nature and remote locations. One key problem in understanding mangroves is lack of popular field guide books and inadequate resource persons to identify mangrove species.

Godrej & Boyce Mfg Co Ltd has been conserving thousands of acres of mangrove forest along western bank of Thane Creek since the decade of 1940s. In this rich biodiverse forest, we have recorded 16 species of mangrove and mangrove associated plants, which provides ecosystem services to entire Mumbai Metropolitan Region. The mangrove management at Godrej is based on three-pronged strategy of Research, Conservation and Awareness. The ISO 14001:2015 certified Godrej mangroves project has sensitized about 35,000 citizens of Mumbai Metropolitan Region in last four years alone. To know more about Godrej Mangroves, please visit www.mangroves.godrej.com.

To overcome the challenge of inadequate resource persons and field guides required for mangrove conservation, Wetland Management Services Department of Godrej & Boyce Mfg Co Ltd has developed a mangrove mobile app to enable interested individuals and organizations for identification of mangrove plant species. The app covers 67 true mangrove and mangrove associate species found in India in 11 languages. These languages include 9 regional languages of coastal states where mangroves are found along with Hindi and English. The users have choice to identify the species based on leaf shape, flower color, taxonomic, common English and regional names of the species and species location (occurrence of mangroves species in particular coastal states). Besides the identification feature, the app offers other interesting information like description of every plant species and its uses. It has a separate section on mangrove ecosystem with information on mangrove distribution, adaptations, biodiversity, threats, conservation measures and role of stakeholders. It helps the users with glossary of technical terms. The app provides optional feedback feature for users to offer suggestions for app improvement and to share relevant information. The app is available on Android, iOS, and Windows platforms.

The app is Asia's first mobile app for mangrove ecosystem and first one developed by a corporate to encourages 'citizens science', the biodiversity conservation strategy recommended world over. It is useful for researchers, teachers and students, Government agencies such as the Forest Department, Kharland or Revenue departments, NGOs and CBOs, and any other interested individuals and organizations. The app developer team has compiled useful recommendations sent by the users for its improvement through the feedback feature connected to mangroves@godrej.com email id.

Following methodology was devised and applied in development and dissemination of the mangrove mobile app.

- Data Compilation and verification:
- Images Compilation and verification:
- App Framework Development
- Technical Development
- Pilot Testing
- App Dissemination

The Godrej mangrove mobile app was first launched in July 2017 by the Honorable Chief Minister of Maharashtra state. It contained 24 true mangrove and mangrove associate species found in Maharashtra. The App was downloaded by 1314 users from 33 countries and received great appreciation and feedback. An important and consistent feedback was development of India specific Mangroves app that could be used by local coastal community, Forest Department staff on field and NGOs in their regional language for better App outreach and its efficient use.

Considering the feedback, Godrej initiated development of next version in FY 2018 and upgraded the App to 67 mangrove and associate species in 11 languageson 5th June, World Environment Day 2019.
Since its launch and upgradation, the Mangroves App has been downloaded by 4500+ users from 65 countries so far. The downloads are tracked regularly by Godrej Infotech Limited.
Godrej Mangroves App is unique in its offline operation eliminating need of internet connection once downloaded. This helps is optimum use in mangrove areas where internet connectivity is often a challenge.

The Godrej mangrove mobile app was first attempt in Asia for effective use of information and smart mobile technology for research and awareness of mangrove ecosystem. The number of downloads from across the world and feedback from users supports hypothesis of effectiveness of the mobile app. The App supports Sustainable Development Goals 9, 11, 13, 15.

F5

Microbial Fuel Cells Coupled With Constructed Wetland: Current Research And Future Perspectives For Wastewater Treatment And Electricity Generation

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Introduction
The CW-MFC is a newer treatment system in which the cathode and anode of an MFC are embedded in a constructed wetland (CW). CWs are used widely in wastewater treatment and have been applied to treat many types of wastewater, including domestic, industrial, urban, and agricultural. MFCs can recover energy from organic and they are considered a promising wastewater treatment technology. CW-MFCs have the advantages of both CWs and MFCs for wastewater treatment. They can transform chemical energy directly into electrical energy, thereby reducing energy loss. Moreover, they are reliable and suitable for long-term operation. Research has shown that MFCs can be used to treat various types of wastewater, including domestic sewage, municipal, industrial, leachate and food processing wastewater. Technology combining CW systems with microbial fuel cells (CW-MFC) has promise for both wastewater treatment and bio-electric production. In this system approach, electricity is produced with biodegradable substances as bacteria oxidize organic or inorganic matter in wetland soils. The construction and operation costs of constructed wetlands are very low due to the minimal or even no energy requirement.

Keywords: Microbial fuel cell, Constructed wetland, Electricity generation, Wastewater treatment, Innovative constructed wetland.

F6

"Skill India - Need towards Sustainable Development using Technology and Innovation"

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In terms of Skill India- India is at a turmoil, as it is going to become one of the world's largest economies in the next one decade or so and the world's most populous nation. Technology and skills are the key drivers of the economy, the change in nature of jobs is inevitable. Artificial Intelligence, AR/ VR. Integration and Internet of Things (IOT) are set to disrupt the workplace and the pace of job creation. The new age jobs requires of its aspirants to be more skilled in a way that industry are ready to hire them in between of their training. In short term, there is a need to leverage technology for driving innovations across the value chain, to make vocational education more desirable, accessible and affordable. The penetration of mobile phones and broadband services is considerably high in our country. Even a person who cannot read or write can understand visual patterns in mobile phone. In this regard, the JAM trinity - Jan Dhan, Aadhaar and Mobile (m-learning) can be effectively utilized to create audio visual content and mobilize/ train the masses effectively at low cost utilizing existing infrastructure. Vocational education needs to be made more aspirational, accessible and affordable especially for women and youth from rural areas.

F7

Emerging Green Technologies for Combating Environmental Pollution and their Usefulness in Sustainability Education

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Sustainable education is dissemination of the latest high quality knowledge and interdisciplinary research to discuss ideas, problems, challenges and solutions for the changes in society, brought by emerging technological innovations. Sustainable technologies are necessary for fostering economic development of the society. However, to sustain modern and innovative technologies, sustainability education is a prerequisite, and further there is need to build the capacity to exploit opportunities and innovations, which offers benefit of inclusion and sustainable development of the society. New technological applications, such as block-chain, machine learning, MOOCs or virtual learning environments, are being increasingly used for teaching and learning. This is further echoed within the global debate on the use and effects of emerging technologies on sustainability education in particular.

Sustainability education mainly focuses on developing interdependency among student, teaching, non-teaching staff in school, university and institutions in order to prepare a good future citizen for better world. This can only be achieved by preparing the peoples to give a compulsory input in order to protecting and making environment healthier. Besides, developing vision, mission, and values in educational framework to get multiple dimensions of enviromental sustainability could be a giant step towards sustainability education.

Anthropocene activities are main driver of climate change, global warming, biresource degradation and biodiversity loss, exacerbating pollution problems and huge economic losses, which raise the significant question for the present education system. Several hazardous pollutants also play havoc with the respective ecosystems endangering the life and quality of natural ecosystems to a great extent. Therefore, education for sustainability is of utmost priorities. This might develops awareness and knowledge of sustainability and develop students in schools that are able to think critically, innovate and provide solutions towards more sustainable patterns of living. Sustainability education is future-oriented, focusing on protecting environment and creating a more ecologically sound and socially equitable world through informed actions, in which use of new emerging technologies are crucial. Green technology based remedial measures to combat pollutants are required for a sustainable future. Green clean is the civic sense needed to be developed by educating students by demonstrating and cultivating the culture amongst them, so as to provide a healthy and sustainable planet to the future generations.

THEME G - SUSTAINABILITY EDUCATION IN THE INSTITUTIONAL FRAMEWORK

G1

Perspective Building for Environment among Teachers: A Curricular Initiative for Sustainable Development

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ABSTRACT

The present paper delves into the teachers' understanding and perceptions about environment as a subject at the school level. It explores the need and rationale behind introducing a course on Environment Education and also ascertaining its effectiveness at the teacher education level. The value of pre-service curriculum lies in its multiplier effect in terms of educating the pupil teachers and through them reaching out to millions of students, therefore, curricular interventions in the area of environment education at teacher education level would be highly impactful. Teacher Education Programmes have the onus to prepare the pre-service teachers with necessary skills, values and facilitate their capacity building for effective transaction of the curriculum in the school system. The perspective papers, pedagogy papers and the elective courses offered in the two-year pre-service teacher education (Bachelors in Education, B.Ed.) curriculum build a foundation for further growth and professional development of teachers. Needless to say, a need was felt to develop and design the course as relevant as Environment Education with an aim to sensitise the pre-service teachers about the concepts such as, environment, development and their inter-relationships and also more importantly, the ways of transacting the environmental issues and topics related to environment in the classroom. This course has only been recently introduced in the two-year B.Ed. curriculum, right now as an elective paper. The impetus behind introducing this paper can very well be ascertained from the following point put forth by NCF-2005.

"Environmental education (EE) is ideally placed to serve as the lever for this paradigm shift that would focus, not on memorising what authoritative textbooks decree to be correct answers in order to reproduce them to get good grades, but instead on learning, on building capacity for critical thinking and problem solving. Since holistic thinking is at the heart of EE, the new paradigm would replace sectoral thinking by multidisciplinary thinking."
(Position Paper on Habitat & Learning- NCF 2005)

The focus of the elective course is not just to generate awareness about issues related to environment, such as pollution, climate change, global warming, nuclear energy, deforestation, etc. but also to enable the student teachers think critically about these issues. The course is such designed so as to incorporate the learning from different disciplines, like, Sciences, Social Sciences, Language, History, arts and aesthetics, Mathematics, etc. for a holistic and multi-disciplinary understanding about the environmental issues. This change in perspective includes viewing environment not just as a resource bank but as an entity in itself which is prone to changes and is finite in terms of resources rather than ubiquitous. Applying the Kantian principles, the environment should not be treated as a means to an end, that it provides us oxygen, minerals, water, ores etc. but, the need is to move towards treating the environment as an end in itself and preserving it.

In the light of above background, the objective of the present paper is to present and analyse the experiences and perceptions of in-service teachers, teacher educators and curriculum designers about the need for such a course on Environment Education (EE) at pre-service level. Another aim of the present paper is also to understand and analyse the effectiveness of such a course from those who opted for it during their pre-service teacher education programme. It further provides suggestions and a roadmap for further integration of the environmental component within the curriculum in order to cater to the sustainable development goals for conserving the environment and preservation of its resources.

Key Words: Environment Education, Teacher Education, pre-service curriculum, sustainable development

G2

Transforming Business Education at MBA Levels

Consistent With the UN's Sustainable Development Goals

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Sustainability Education is the fourth of the seventeen sustainable development goals set forth by the United Nations General Assembly in its Resolution 70/1 in 2015. This goal seeks to "promote the integration of principles, values and practices of sustainable development into all aspects of education and teaching from kindergarten up to university and lifelong learning. The UN Decade of Education for Sustainable Education (DESD 2005-2014), followed by the five-year Global Action Plan (GAP 2015-2019) predominantly focused on accomplishment of ESD goals, have seen an enormous amount of work done by UN, UNESCO, UNEP, UNDP and numerous other partners to strengthen and re-orient education at all levels so as to achieve the goals of social development. The GAP, consistently evolving with additional plans, events, and efforts directed towards redesigning and reorienting ESD, serves as a key component of US Agenda 2030 that aims to attain the UN's sustainable goals by 2030.

To serve as an effective contributor in furtherance of UN's Agenda 2030 is the singular driving factor and key motivation of this work. Given our expertise, we focus on developing recommendations for redesigning and renovating the existing curricula, course contents, and technological approaches for course deliveries that would *strengthen* and *re-orient* the education content delivered at baccalaureate and masters level in business schools in to maximize the impact of business education on UN's social development goals.

Among the notable features of this work are:

(i) **Redesign and Alignment of Business Curricula with Sustainability-Dominant Content**:

The competitive landscape of businesses has witnessed a major paradigm shift since the financial and economic debacle of 2007-8, especially in the advanced economies of the United States and West European Economies. The Asian economies have been slow to follow suit but are on the cusp of this transformation. The paradigm shift referred to here is called the Triple Bottom Line (TBL = Profit, People, Planet) of business performance. In the industrial world of post sub-prime mortgage fiasco, where imminent extinction stared in the face of countless businesses, they scrambled to find new and novel ways to compete. The paradigm of single bottom line competition pursued hitherto; namely, profits as the singular motive for survival and growth, would not serve as a viable competitive dimension as the customers were looking for greater nobility in business strategies, policies, and operations. Earning profits, however great, were no more guarantee of business longevity or sustainability. Compelled by the specter of extinction, businesses added "humane values" to their performance measures in the form of enhanced social responsibility and environmental preservation. Contrary to the fears that adding such value would erode profits, this expansion of components of business performance for competitive purposes earned reputational dividends, enough to exceed the expenditures incurred in embedding these values. The TBL paradigm thus established itself as synergistic to profit as opposed to subtractive. Coincidentally, the same values – social responsibility and planet preservation – are required by the UN charter of social development goals. We, therefore, strongly recommend that all business curricula should be redesigned to include a complete exposure to TBL-based business models, strategic formulations and

operational design. We would present specific syllabi that would support this transformation. It should be restated that in our experience, the business executive mindset is still fearful of competing on value and changing that mindset is and immediate and critical responsibility of business schools.

(ii) **The PRIME (Principles of Responsibility in Management Education)** initiative was started in 2007 under the aegis of the United Nations. Its charter of goals was similar to that of GAP, i.e., to support the sustainable development goals of the United Nations; however, PRiME has an exclusive focus on Management education. This is especially relevant as the ethical content of managerial behavior has significantly deteriorated and there is dire need to create graduates who understand the absolute indispensability of ethical and responsible behavior in their conduct. Along with TBL which seeks to induce ethical and responsible behavior, we introduce specific components (case studies based course) in business curricula that underscore the pitfalls of unethical conduct.

(iii) **Measuring Degree of Sustainability** in Institutions of Learning: Finally, in this paper, we also discuss new measurement models for ranking of business schools that wish to pursue the new paradigms of sustainability be developing new curricula, courses and deliveries. Of course, additional variables such as ongoing research, number and quality of publications, leadership in sustainability related events/conferences will all constitute proportionate part of an overall index of a school's performance as sustainability education provider. For this, we borrow from Aspen Institute's Beyond Grey Pinstripes models and AASHE's Star Rating system.

We conclude by stating that transforming business education employing sustainability-driven curricula earn significant reputational dividends that, in the end, help school raise it stature and student enrolment.

G3

Research and Learning For Sustainability Education

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The adoption of the 17 sustainable development goals by the UN in 2015 must lead to greater experimentation and learning on attaining specific mix of SDGs that are place and people-specific. Global surveys leading to the adoption to SDGs, and more recent studies on preferences of selected epistemic communities have shown that people, in general, prioritize action to deliver basic goals such as zero hunger (SDG2), education (SDG4), ending poverty (SDG1) and water sanitation (SDG6) in comparison to, for example, climate change (SDG13) which dominates global debates and discussions. But, research and learning in specific places engaging communities to identify and take actions to collaboratively attain chosen combinations of SDGs can enhance learning and generate data, information, experience and knowledge that could serve as resources both for formal and non-formal educational systems including development of curricula. During UN's 2030 agenda, efforts to identify places and their resident communities where research and learning for sustainability can be supported on a systematic basis are needed. Such "long-term" sustainability learning laboratories where researchers, academics and students engage with resident communities to collaboratively identify priority mix of SDGs and elaborate and implement actions to attain them can generate valuable experience, lessons and case studies to inform the assessments and performance evaluations that will be undertaken as we approach 2030. If such sustainability laboratories are set up with the support of Government, the private sector and civil society their contributions to research, learning and education for sustainability can continue well beyond 2030.

G4

Inculcating Sustainable Development among Stakeholders of Higher Education Institutions in India

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Universities play a crucial role in the disseminating knowledge about the environment. We are living in the times where we are witnessing depletion of natural resources, environmental degradation, and the pressing need for provision of clean food, water and living conditions for an increasing population. These complex problems need critical solutions to be provided by the Academia and the educated youth of the country. Education for sustainable development can take place through teaching programmes and courses related to environment as well as greening process of campus, this can lead to raising awareness about the environment among the stakeholders of the higher education institute. This paper sets out to discuss the themes and tools that can be found to promote sustainable development across higher education institutes in India. An analysis of Self Study Reports and supporting documents to National Assessment and Accreditation Council (NAAC) by A/A+ Graded Universities is conducted, showing the varied programmes and green initiatives taken up by them.Across the institutes, it was observed that their efforts displayed varying degrees of commitment towards the environment. This analysis of the available information indicating the level of commitment towards the environment by different Universities fills a gap in literature and promotes the importance of developing the learning of sustainable development among the citizens.

Keywords: Universities, NAAC, Greening Process

G5

Kaagadam: An Initiative To Create A Paper Recycling & Learning Centre Within The School Campus

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Introduction

Thane's St Xaviers High School and Junior College has set a unique precedent for several other schools in the city by managing the waste generated in its premises. The organic waste is composted onsite; sanitary waste is handed to vendor (Rentokil Hygiene Service) for safe management. As an extension to the school's Zero Waste Campaign, in 2018, the school installed a Handmade Paper making unit, to manage the paper waste and thus create a learning centre to educate school students on the rationale, theories and practice of solid waste management.

Method:

A 1000square feet of area was identified for setting the waste paper recycling centre in the school premises. A Handmade Paper making unit of TARA make, of capacity 6kg/cycle, containing a beater, a Univat, a calendaring machine and a drying area was installed.

Three women were hired and trained to run the machine, thus providing livelihood to women from lower socio economic background

Segregated paper waste generated in the premises like school papers, notebooks, carton boxes etc. were utilised as raw material for paper making. The unit today produces 100 papers in a day

Results:

The school has created a one stop learning lab for its 6000+ students, and has thus achieved following objectives:

- Sensitize future citizens towards importance of recycling and decentralised waste management
- Opportunity for Experiential learning: The unit demonstrate a methodical process of paper recycling, which includes from sorting to pulping to making of finished product.
- Engage students to utilise handmade paper in a creative manner , like, for making seed papers, rakhis, gift items etc. for self-utility or for sale
- Introduce students to the science of papermaking process, i.e. to make strong paper, long fibres are required, which can be achieved by beating instead of chopping, water acts as a binding agent between the fibers causing it to dissolve in the water and finally when the pulp is spread in a sheet to dry, the glucose molecules in the paper re-bonds with the cellulose molecules to hold the paper together.

Conclusion: A decentralised waste management unit within school premises like a paper recycling or composting unit, apart from turning waste to resource and reducing the burden on our natural resources, can also teach children, concepts and skills that integrate with several subjects, while inculcating personal and social responsibility.