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GREEN EDUCATION CONCEPTS & STRATEGIES IN HIGHER EDUCATION MODEL

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Abstract:

Green Education in the service sector is expected to transform education sector and is combined with the trend of world economy development. Environmental benefits and sustainability are two characteristics of Green education. In the green education model, service is expanded as, what kinds of education is provided by organizations (the process of service creation), how such services are transferred to the customers, how will the benefits be captured by providers around service (value realization). Education services are also working towards achieving green and being environmental friendly. Growth or learning will only take place in an environment which is conducive for development in children's life. Academicians, administrators, students need to incorporate awareness and adoption of environmentally friendly practices in the learning process. The culture of conservation has to be an integral part of the curriculum. The tools and techniques along with eco-friendly building and equipment have to be used in the teaching-learning process. The future generations should be able to understand and protect natural resources and in that process protect human health by being environmental initiators. In this paper, we have analysed and discussed how Education sector can transform themselves into Green Education in terms of their opportunities and challenges by considering advents in technology and readiness of the learners. Opportunities to go green, Challenges to go green, the consequences of going green, and sustainability of education sector by technology adoption are also discussed.

Index Terms: Green Education, Sustainable Education & Technology Adoption in Education

1. Introduction:

The present environmental issues and facts have created awareness on the kind of impact that it will have on future generations. This has initiated necessity of going green and being sustainable which has created an increased demand for green services and products. This undoubtedly is of recent origin where the consumers demand green services and products. Going green is important and crucial especially for the developing economies because of its population and natural wastage. It is very crucial to create a sustainable future. This generation of consumers and manufacturers are responsible for the climate change and the rectification of this mistake can happen if we go green in possibly all sectors. Green concept is used in effective management of energy [1], green management education [2], green service industries [3] and many other fields in the society.

Higher education plays a vital role in creating role model citizens of the country. These students need to understand the associations and links between the environment, conserving energy, ecology and economy. Higher education has 3 objectives namely academic teaching, industrial research and community services. Universities are therefore are forced to create students who will play a crucial role in engaging with the society's problems and provide solutions to those problems.

2. Sustainability in Higher Education:

The affect of the environmental problems should be the major issues in all colleges and universities where students are an integral part of it. Green and

sustainability are important opportunities for the students when they become a part of professional and labor markets. When higher education goes green it also creates a high public image, helps in attracting and retaining the best and committed employees and having best students who would aspire to be under such colleges and universities. The United Nations had constituted 2005-2014 as the decade for green education development. This was done to create a positive impact on the society at large by bringing greenness with sustainability in higher education sector [4-6].

A continuous demand exists from the student's side that opts for a career which is meaningful and unique and which is sustainable. Universities need to bridge this gap by integrating green lessons in existing university and colleges. Research done by National Wildlife Federation revealed that only 13% of the universities out of 715 universities have a course in environmental education. These courses are underutilized but it is gaining momentum. Sustainable education has to get the collaboration with the industry and future industries. Sustainability challenges in the community should be addressed. Students are to be provided with the opportunity to study and apply the concepts, methods of applying green in all functional areas of management. If they have an understanding of the issues it will help in future to apply solutions to the organisations that they join.

Education systems have a responsibility for alternative thinking and creating new ideas and challenging the old school of thoughts. This will lead to different thinking amongst the students and help them in any kind of social interaction. When such an education culture is brought in it leads to transformation thinking in society. So the students who come out from such a system will be employable graduate who is an asset to the society.

3. Green Concepts in Higher Education:

Green higher education is all about creating of knowledge, skills, attitudes and values related to environment. It's more needed in higher education because of the dependence of environment with the economy. The green economy should be used as the centre point for understanding the inter links between natural environment and the other environmental forces like political, social and economical. Higher education plays a pivotal role in creating and developing human capital. This resource that is created should not just look at economic point of business but societal aspect as well. The demands for green jobs are on high. The solar energy and wind energy has to be still be utilized to reach out the masses in an efficient manner which calls for efficient green managers. From the construction industry to all management sector there is a need to create sustainable future which means that many green oriented graduates are needed.

The infrastructure has to be in such a way that buildings, energy costs, reliability and performance which has a positive impact on the environment. The faculties will be promoting learning in a conducive environment where they will address local, regional and national development issues. The systems, processes, structures, procedures and devices to learn green are eco friendly ways. Green can be used in a large way when it is open and distance learning. Continuous research on green jobs, green concepts, and promotion of it in operations management is needed. The college resources should be in a manner of commitment by top administrators, building facilities, faculties who believe in green ideology, curriculum that supports philanthropic and interest amongst students. It is very essential that sustainability be brought into business model. The environment provides typical challenges to the current and future generation in terms of climate change, resources getting depleted, water issues, poverty, food and war issues, environment caused diseases and pollution. This is further accelerated in

developing countries because of less economic development and high population explosion. Initiatives taken from the colleges and universities will help students develop knowledge, skills and attitudes to fight with these issues.As a university they have an important role in reviewing the various courses and degrees and address issues which addresses about sustainability. The teachers who are a crucial stake in this system have a great role to keep updated and informed and transfer knowledge in innovative way. The whole methodology of teaching should be learning oriented rather than teaching oriented. Pedagogy should include the real world learning experiences so that the learning is very fruitful.The subjects that can be added in this kind of systems are agriculture, organic farming, climate and atmosphere, green tourism, green medical services, green transportation etc. In this form people planet and profit will be achieved in all industries.

Green education also includes enhancing student knowledge in using green technology. Computer and information technologies are already considered as green technologies due to their contribution to clean environment in many industrial automation process. Green nanotechnology has been described as the development of clean technologies, "to minimize potential environmental and human health risks associated with the manufacture and use of nanotechnology products, and to encourage replacement of existing products with new nano-products that are more environmentally friendly throughout their lifecycle. Green nanotechnology is the study of how nanotechnology can benefit the environment, such as by using less energy during the manufacturing process, the ability to recycle products after use, and using eco-friendly materials [7-13]. Table 1 depicts the comparison of conventional education with green/sustainable education.

It is well known that we can improve the performance of any system by comparing it with a hypothetical, predicted system of that kind called "Ideal system" [14]. It is found that, by keeping such hypothetical devices or systems in mind, researchers have continuously been improving the characteristics/properties of practical devices / systems to upgrade their performances. It is also assumed that ideal systems will consume zero input, zero energy, zero maintenance cost and produces infinite output. Hence, ideal properties of a device or a system can be used to upgrade or improve its properties towards reaching 100% efficiency. By comparing the properties/characteristics of a practical device/system with its ideal counterpart, one can find out the possible modifications in that device /system towards reaching the objective of achieving such an ideal system [15-22]. Ideal systems always sustainable systems due to the fact that they do not degrade the environment, and hence are green systems.

Table 1: Comparison of conventional education with green /sustainable education

S.No	Conventional Education	Green/Sustainable Education
1	Only profit orientation	People, profit and planet orientation
2	Out dated pedagogy	Modern pedagogy
3	Demand for formal graduates decreasing	Demand for green jobs are high
4	Traditional approach	Contemporary approach
5	Usage of technology which is outdated	Green technology is being adopted
6	Environment gets degraded	Environment is upgraded

4. Green Model in HE:

Green higher education has three essential components:

- ✓ Creating awareness amongst the public to achieve sustainability development and results if we fail to do so.
- ✓ Concentrating on curriculum of green education by including the current knowledge and skills required in industry.
- ✓ Appling the green concept in each and every process in industry and society for maintaining sustainability.

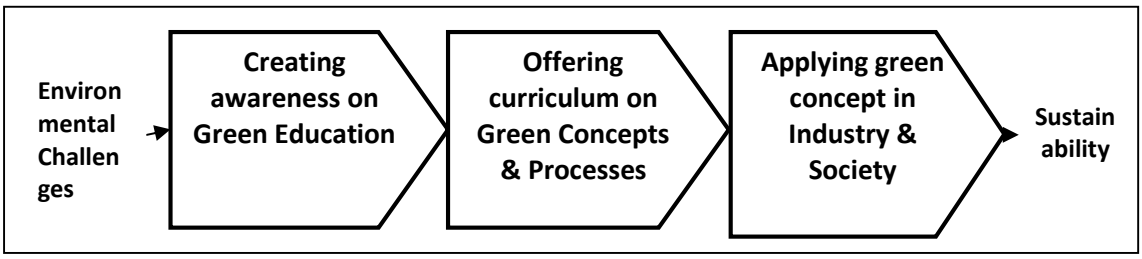

Figure 1: Green Model in Higher Education

Green Environmental Sustainability:

Sustainable development highlights the development that fulfills the needs of the present generation without compromising the needs of the future generation. The resources are exhausting at a fast pace which means there's a continuous demand for products and services which do not cause burden on the planet. Along with economic development there is a need for environmental uplifting. Unless environmental sustainability is achieved sustainable development cannot be achieved. Life style of people should be within the planets ecological setup. Reduce, Recycle, Reuse are the three terms mostly used by every individuals or corporate or nations.

Role of Science and Technology for Contributing to Environmental Sustainability:

There is a strong notion amongst the intellectuals that the twin objectives of achieving sustainable development with environmental sustainable can be achieved through the use of science and technology. This requires a fundamental shift in people's attitudes towards nature and environment. This change in attitude can be brought about my creating awareness when they are young in educational institutions. Higher education can play a forefront role in imparting the environmental values and making them equipped about green services and products. Science and technology has touched every aspect of modern life.

From the time of industrial revolution economic development has been with the usage of science and technology. Science and technology has numerous benefits. But it has been targeted for spoiling and degrading the environment. In the present context science and technology can be used for understanding the potential environmental problem in terms of pollution or ozone depletion. The only solution is to reduce or stop the CFC emissions and probably through it save the environment for future generation. Through technology the problems can be detected but the solutions have to be looked beyond science and technology.

5. Green Strategies:

Strategies of an organization or individual are divided into five types as (1) competitive strategies also called Red ocean strategies (Porter M.E. 1998) [23], (2) monopoly strategy called Blue ocean strategy(Han Kim W. 2006) [24], (3) sustainable strategy called Green ocean strategy (Hou, Shengtian, 2007) [25], (4) a mix of Blue and Green called Purple ocean strategy (Babelfish, 2007)[26], (5) unethical strategy for one time survival calledblack ocean strategy (Aithal P.S 2015) [27] and combined/white

ocean mixed strategies [28]. Some of the strategies to be used in green education are identified and depicted in fig. 2.

Strategy 1: Incorporating Sustainable Principles into Coursework

- ✓ Interdisciplinary academic courses
- ✓ Subject specific courses
- ✓ Distance learning programs
- ✓ Training in hands-on approach
- ✓ Faculty who are energy experts to main the art of developing tailor made energy systems
- ✓ Skills Certificate program
- ✓ Lab setting and testing ground for green resources

Creating green courses across various departments brings a holistic agreement of opportunities, principles, challenges and answers to sustainable practices. Co-teaching can help in incorporating sustainability if they have not trained background. Green is required in all related fields of planning, organizing irrespective of functional areas like marketing, finance, operations or human resources. A comparison and analysis of the traditional practices is being questioned and new ways of green techniques are incorporated.An interactive web-based syllabus eases interdisciplinary communication amongst professionals, students and society members with extensive understanding of sustainable business practice and reciprocal with the government authorities, professionals, researchers etc. Collaboration with higher education institutions and research experts is a good route to make students understand the present demand of all industries.Aligning academic programs and courses with issuing green technology industries that have the most eminent job opportunities in developing nations. More and more companies accepting and following green industry principles and practices.A subject in sustainability increases a study on sustainable products and services and processes, sustainable building, efficient energy, energy management, marketing and sales for sustainable components, renewable energy etc.

Strategy 2: Acquainting Green Service Learning Requirements

Colleges, universities and business and non business organisations service learning is highly effective strategy. This will leave a positive impact on both the service provider and service receiver. The benefits of sustainability are taught to students. This spreads awareness and teaches practical skills for greening the organisations.

Strategy 3: Enforcing Existing Problem Solving Using Green Concept

Students through direct interaction inside or outside classroom learn greening through experience and hands on approach. This provides opportunity to students to develop problem solving thinking skills. Using internships, research programs, collaborative assignments, out of the classroom teaching, student initiated pedagogy are the ways of pedagogy.

Strategy 4: Bridging Higher Education With Future Employers

Higher education institutions and the future employers should coordinate with each other so that the demand is gauged for green employees. The skill sets and knowledge required by employees can be understood by the universities so that the teaching can be incorporated. Higher education's major responsibility is to impart knowledge and skills needed in the workplace. This helps in the creation of green economy. Students skill set has to be aligned with the current industry demands. In the competitive market innovative programs are needed by the business houses. Case studies are incorporated in class room for better understanding of green concepts and processes.

Strategy 5: Learning from Others Experiences

Learning from the best practices from other companies and green countries helps in achieving sustainability. Learning from other disciplines like geology, marine, zoology, business helps in green concept of study. This helps in determining complex objective of achieving pollution control and greening. Co-operation amongst higher education institutions helps in achieving knowledge sharing and management. Developing and improving metrics to measure effectiveness of green educational courses which helps in building and improving curriculum. Academic resources from text books, libraries, websites helps in collecting ideas and information. An innovative curriculum will helps in professional training and decision making.

Strategy 6: Incorporating and Using Green Technology in Education

To aid in greening colleges and universities technology can be of main help. Technology has to be incorporated into the sustainability program across all streams of higher education like in operations, research, and student learning and in house and outreach community programs. Technology will help in designing interactive workshops, collaborations between institutions, consulting projects and for promotion of vision of green higher education. Environmental technology education can be incorporated in curriculum development and program improvements. Green technology in education helps in building energy technology, energy conservation, efficiency in energy and renewable energies.

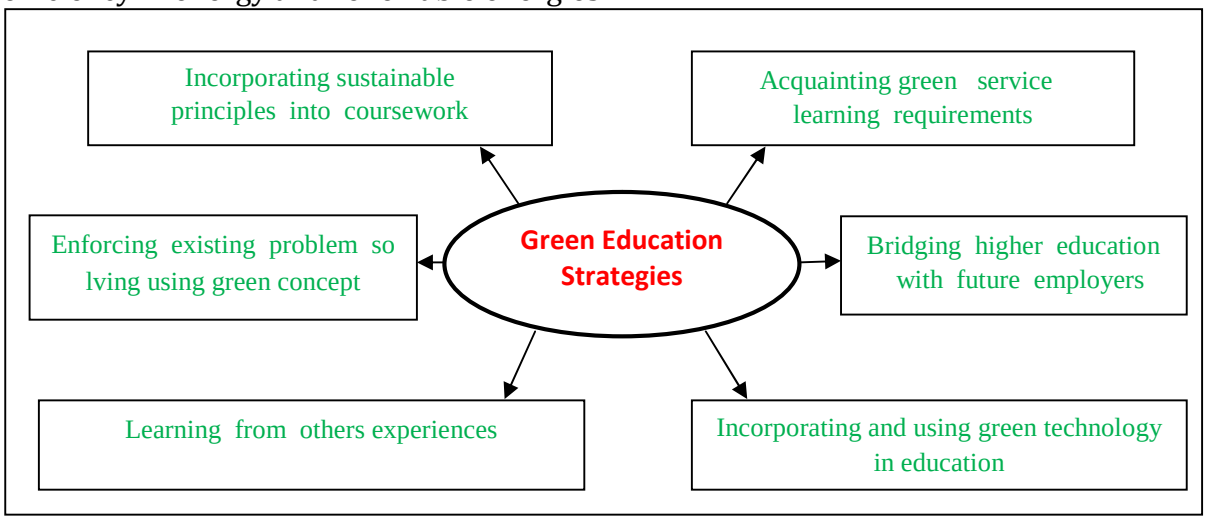

Figure 2: Green Education Strategies

6. Green Model Analysis:

Any business model can be analysed using either SWOC, or newly developed ABCD analysis method. ABCD listing and ABCD framework are two models of qualitative [29-35] and quantitative ABCD analysis method [36-42] respectively. In this section, we have used ABCD analysis for qualitative listing of advantages, benefits, constraints and disadvantages of Green education model.

Advantages:

- ✓ Multifaceted program
- ✓ Modified pedagogy
- ✓ Economic viability
- ✓ Conventional education losing its significance to green higher education
- ✓ Convenience for both teaching and learning
- ✓ Easy accessibility for students

Benefits:

- ✓ Futuristic in nature
- ✓ Eco-friendly approach
- ✓ Innovative thinking in corporate line
- ✓ Sustainable life
- ✓ Strategic differentiation in market place
- ✓ Healthy and equitable future

Constraints:

- ✓ Lack of green adaptability for all categories of products
- ✓ Costlier in implementation of green products
- ✓ Limited course structure and colleges available
- ✓ Undefined themes of green education

Disadvantages:

- ✓ Lack of awareness of green
- ✓ Green is still in infancy stage, lots of research needed
- ✓ Over dependence on technology
- ✓ Lack of conceptual framework for green higher education

7. Conclusion:

There is a need to rethink among the universities in their curriculum designing. Topics have to be diverse, materials may not be available, but it has to be created and developed especially for the 21st century, not just teach the existing data and facts. A cutting edge thinking which breaks the current knowledge format and theories and new thinking is the need of the hour. The current routine structures and practices should be broken which will be an era of transformation in social learning, a learning where the real problems and issues are picked and studied. A curriculum that fits all individuals of all streams so that they can be involved in problem solving that helps people and the planet. Instilling education in young graduates and post graduates to build their professional careers as decision makers in green education will be the game changer. Conventional education is no longer adequate in current times.

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