



BRIEF REPORT

Integrating Sustainable Developmental Goals (SDG's) in Dental Education: An Overview

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ABSTRACT

In 2015, UN General Assembly launched Sustainable Development Goals (SDG's) framework containing 17 universal goals, that were set as shared global targets for a just and equitable world and to be devoid of environmental degradation. Translating the SDG's and to integrate them in dental education includes: a) Developing dental curricula towards sustainable development; b) Modifying the teaching and learning methods of delivering dental education for sustainable development; c) Guiding the students to shift towards sustainability, so to facilitate the next generation of dentist to think mindfully and act consciously. This paper briefs on inclusions and modification required in the dental education to shift towards SDG's.

Keywords: Sustainable Developmental Goals; Dental Curriculum; Sustainable Dental Education

1 INTRODUCTION

The global burden of oral diseases in the form of dental caries, edentulousness, periodontal conditions and oral cancer has affected more than 3.5 billion people across the globe.⁽¹⁾ These alarming rates advocates for appropriate oral health delivery and maintenance to prevail a good oral health related quality of life. General Health and oral health are intertwined and would exhibit consequential effects if neglected or mismanaged.⁽²⁾

Despite no discrete mention on dental health in the 17 agendas of United Nations Sustainable Development Goals (SDG's), the potential link between SDG 3 (Good health and well-being) and SDG 4 (quality education) are well-established to create dental professionals who are mindful, holistic, skilled, and dynamic to adopt sustainable dental practice.⁽³⁾ This needs dental educators who could strategically integrate the core values of ESG framework in the dental curriculum to facilitate and strengthened the student's understanding and bring changes in students' thoughts and behaviour, so to work towards concrete goals of SDG i.e., peace, prosperity, and well-being for all, aligned with environmental responsibility. All of which begins

at institutes of higher learning where sustainability-based curricula and practices are evident. This paper proposes on how tactically the education for sustainability can be integrated in the curricular programs at Dental Schools.

2 EMBEDDING SDG'S IN DENTAL EDUCATION

Students in dental education needs both intellectual and technical skills, relevant basic science knowledge and scientific information to offer clinical care to the patients as well as to the community. Dental schools prepare the students with these skills and knowledge throughout their lifetime in dental practice. Incorporate sustainable education in dental curricula and initiating the practice of sustainable dentistry in the dental schools will have a magnifying impact on the dental students in creating awareness and in motivating their willingness to adopt sustainability.⁽⁴⁾ This shift towards the implementing SDGs in dental institutions can be achieved through following 3 stages:

2.1 Developing curricula for SDG's and Dental Education for Sustainable Development (DESD)

Dental schools should focus on SDG based curriculum and cross-curricular integration. Education is defined as “a cumulative process of development of intellectual abilities, skills and attitudes, all of which form our various outlooks and dispositions to action in life generally”. Education on SDG and instrumenting them as a part of the formal education will bring about a huge change among the professional students.⁽⁵⁾

Curriculum reflecting the objectives of SDG's in their context to oral health and their relative benefits and effects targeting on all the 17 SDG's, ranging from eliminating poverty, ending hunger, promoting health and happiness, gender disparity, clean water and sanitation, inexpensive and sustainable energy, sustainable cities and communities, responsible consumption and production, combating climate change, life below the water, life on land, peace and justice, and forming partnerships to achieve these goals, should be incorporated in the curriculum.

It is a challenging task to educate and reorient the dental students to develop sustainability attitudes, skills, and knowledge, so as to take informed decisions and responsible actions towards environmental sustainability, social justice and economic viability with respect to cultural diversity. The translation of SDGs in terms of dentistry that are to be incorporated in our dental curriculum are represented in Figure 1.



Fig. 1: Sustainable Developmental Goals in Dental Curriculum

SDG 1: No Poverty



- Poverty and its effects on Oral Health.
- Concepts of extreme and relative poverty, as well as wealth; and their effects on basic human rights, in terms of access to dental health.
- Local, national & global oral health inequalities.
- Poverty and its resultant effect as malnutrition, mortality, violence, child labor, modern slavery, leading to environmental stress & shock.

SDG 2: Zero Hunger



- Nutrition, Malnutrition and Nutritional Deficiency Disorder in relation to Oral Health.
- Local, Regional, National and Global Nutritional Program.
- Food insecurity, depletion of soil quality, climate change and thus the individual's psychological vulnerability.
- Institutions and movements related to hunger and sustainable agriculture like the UN's Food and Agriculture Organization (FAO), Food watch, Slow Food, community-based agriculture, the international movements towards food security.
- Concepts and principles of sustainable agriculture and farming, climate-resilient practices, organic farming, biodynamic farming, permaculture, and agro-forestry.

SDG 3: Good Health and Well Being



- Epidemiology of common oral diseases.
- Concept of mental, emotional, environmental health and related behaviors effecting oral health; leading to Xenophobia, addictions to alcohol, tobacco or other drug, low self-esteem.
- Oral health care delivery systems, prevention, and management.
- Philosophical and ethical conceptions of Oral Health Related Quality of Life (OHRQOL), happiness and well-being.

- Indiscriminatory attitudes towards patients with communicable and non-communicable diseases like HIV, hepatitis, mental disorders, or Road Traffic Accidents.
- Understanding of overweight, obesity, insufficient physical activity, and unhealthy food.

SDG 4: Quality Education



- Important role of Quality Dental Education (Knowledge, values, skills, and competency-based learning) and behavioral modification needed to promote sustainable development.
- Encourage inclusive and equitable quality education, fostering lifelong learning.
- Empowering young dentists.
- Dental awareness campaigns, partnership programmes between dental institutions and dental practices.
- Concept of education for sustainable development (ESD) and institutional approach as a key strategy to scale up education for sustainable development.
- Developing partnerships between schools, universities and other institutions offering education in different regions of the world and shift as a Sustainable Dental School.

SDG 5: Gender Equality



- Dental Curriculum should introduce the concept of gender, gender equality and gender discrimination, basic rights of women and girls, (while respecting cultural sensitivity).
- Recognizing and reporting child abuse and neglect, domestic violence.
- Oral Health for pregnant and lactating mothers.
- Understanding the role of education, enabling technology and legislation in empowering and ensuring the full participation of all genders.

SDG 6: Clean Water and Sanitation



This is very important as abundance of water is used during dental treatment.

- Education on global water cycle, water distribution, water harvesting, wastewater treatment, recycling, and reuse technologies.
- Importance of water, hygiene, sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies, water patents, landscaping for groundwater recharge as well as integrated water resources management.
- Climate change impacts of pollution, water-related ecosystems, water-borne diseases.
- Water quality and quantity parameters for oral health.
- Biomedical Waste Management.
- Infection control and asepsis.

SDG 7: Affordable and clean energy



- Renewable energy in dental care and their production, supply, demand and usage; their impact on environment.
- Encouraging eco-friendly dental practice energies like solar, wind, water, geothermal, tidal.
- Concept of energy efficiency and sufficiency in energy usage.
- Radiation protection and pollution.

SDG 8: Decent work and economic growth



- Concept of entrepreneurship, innovation, health economic in dentistry.
- Concept of sustained, inclusive, and productive employment.
- Dental ethics and work ethics, policies and management.
- Dental practice management and career guidance.
- Dental ergonomics.

SDG 9: Industry, Innovation and Infrastructure



- Adopting sustainability of information and communication technology, there by reducing ecological footprint, including supply chains, waste disposal and recycling, encourage quality and sustainable infrastructure, transport systems.
- Dental Manpower planning.
- Dental collaboration with industries.
- Public private partnership in oral health care delivery.

SDG 10: Reducing Inequalities



- Concept of GLOBAL CITIZENSHIP.
- Understanding that ‘inequality’ is a major driver for societal problems and individual dissatisfaction.
- Oral health care delivery for vulnerable populations (urban slums, rural areas, tribal areas, old age homes, orphanages, schools for differently abled).

SGD 11: Sustainable Cities and Communities



- Sustainable Dental Clinic, Hospitals, and Institutions - in terms of space, energy, water, infrastructure, transportation, communication.
- Sustainable resilient buildings and spatial planning, waste generation and management (prevention, reduction, recycling, reuse)
- Sustainable communities and their dynamics (Green Roofs, rainwater harvesting, sustainable urban drainage)
- Preparedness and resilience to weather problems in the future and a culture of prevention.

SDG 12: Responsible consumption and production



- Interrelation between green production, supply, and value chains in dentistry.
- Sustainable food and energy production along with their sustainable consumption coupled with awareness in sustainable lifestyle.

- Diet, nutrition counselling and nutrition.
- Quality lifestyle, oral health, social impacts of production and consumption.
- Tobacco cessation education / counselling.
- Legalities regarding media and advertising, enterprises, consumers, etc.

SDG 13: Climate Action



- Understanding the hazards like drought, weather extremes, etc. and their unequal social and economic impact
- Education about prevention, mitigation and adaptation strategies and their connections with energy and climate.
- Ethics, climate change, global warming.
- Future scenarios and preparedness.
- Knowledge about disaster management and pollution control.
- Local, national, and global institutions addressing issues of climate changes.
- Local, national, and global policy strategies to protect the climate.

SDG 14: Life below water



- Protecting hydrosphere and its habitats.
- Education on balancing marine ecology.
- Sewage treatment to prevent pollution of water bodies.
- Ocean pollutants: plastics, microbeads, sewage, nutrients and chemical.
- Management and use of marine resources (renewable and non-renewable).
- The oceans and international law: international waters, territory disputes, flags of convenience and their related issues.

SDG 15: Life on Land



- Ecology, specific ecosystems and their restoration.
- Over-exploitation, dangers of extinction and the possible imbalances.
- Evolution and genetics, genetic resources, and ethical aspects.
- Ethics in dental profession.
- Occupational health and hazards.

SDG 16: Peace, Justice and Strong Institutions



- Importance of the international human rights framework.
- Local, national, international legislative and governance systems.
- Upholding justice, inclusion, and peace; and supporting strong institutions in their country and globally.
- Prevention of ragging in dental institution.
- Role of institutional ethical committee.
- Women grievances in workplace.
- Consumer protection act.

SDG 17: Partnership for the Goals



- Organization, structure, policies, power dynamics, shared accountability, and possible conflicts & resolutions procedures to address global challenges.
- Global citizenship and shared knowledge.
- Importance of industry - academia collaboration.
- Collaborative research, engagement and enrichment.

2.2 Teaching and Learning in Dental Education for Sustainable Development (DESD)

The current dental education is of pedagogical style. It is the combination of teaching methods (what instructors do), learning activities (what instructors ask their students to do), and learning assessments (the assignments, projects, or tasks that measure student learning). The learning approach in pedagogy is transfer of knowledge, acceptance of status quo and its reproduction as evaluated results. Paradoxically, the educators of DESD have to transform students' thinking

and actions. DESD has to be a strategic, clear and provide both systematic and holistic understanding of sustainability, which needs 'Transformative pedagogy' in dental education. It uplifts the learners to think critically and be reflective in their learning process, so to contribute actively and mindfully.

Transformative Pedagogy is based on the principles that it allows students to be more perceptive, thoughtful, and deliberate towards outcome.⁽⁶⁾ Transformative learning is enquiry-based learning. It encourages to view the issue in multidimensional ways with an interdisciplinary approach. It facilitates higher order thinking skills through critical reflection, imagination, creativeness, innovation, and inventive skills.⁽⁷⁾

Transformative learning ensures competence in cognitive, behavioral, and emotional domains and triggers the shift from transmissive to sequential outcomes, so to ensure both personal and societal transformations towards sustainability. The learning in transformative pedagogy will be through gamification, inquiry-based learning, and technology-enhanced learning. Students convey their understanding through debates, classroom group discussions, societal campaigns, students' clubs/associations/initiatives, community outreach activities, and leadership programmes to represent themselves as conscious and engaged citizens.

2.3 Taking action for sustainable development in oral health

The focus of DESD is to nurture individuals' willingness to take concrete action to support sustainability in their dental practices and offer sustainable dental treatments. Dental Educators must be the key motivator for sustaining behavioral change, who could guide their students to address diverse sustainability issues (waste disposal, single use plastic, energy conservation etc.) in dental practice and advocate for sustainable development. As action towards sustainable development in oral health, students would be involved in the process of designing, implementing and/or developing solutions to the real-world problems observed in our communities.

3 CHALLENGES IN DESD

1. **Dental educators training and orientation:** DESD requires specially trained dental educators in sustainability sciences to strategically execute the transformation in teaching and practices for the young dentists.
2. **Dental institutions:** The first change should begin at home. Dental institutions should foresee the broader perspectives and bring about modifications in their micro and macro management levels to sensitize and mobilize a sustainable institution.

4 CONCLUSION

DESD is an achievable change. Intensity of vulnerability and real time cold severity has to be made understandable to next generation citizens, to derive a radical framework of consensual transition in the dental education and curricula structure, facilitated with interdisciplinary aids to boost the willingness of students to move towards sustainability.

REFERENCES

- 1) Global oral health status report: towards universal health coverage for oral health by 2030. 2022. Available from: <https://www.who.int/publications/i/item/9789240061484>.
- 2) Sabbah W, Folayan MO, Tantawi ME. The Link between Oral and General Health. *International Journal of Dentistry*. 2019;2019:1–2. Available from: <http://dx.doi.org/10.1155/2019/7862923>.
- 3) The 17 goals . . Available from: <https://sdgs.un.org/goals>.
- 4) The Mission of Education. In: Field MJ, editor. Dental Education at the Crossroads: Challenges and Change. Washington, D.C., USA. Institute of Medicine (US) Committee on the Future of Dental Education. 1995. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK232252/>.
- 5) Bamisaiye R. A practical approach to philosophy of education. AMD Publishers. 1989. Available from: https://openlibrary.org/books/OL1975621M/A_practical_approach_to_philosophy_of_education.
- 6) Seatter CS, Ceulemans K. Teaching Sustainability in Higher Education: Pedagogical Styles that Make a Difference. *Canadian Journal of Higher Education*. 2017;47(2):47–70. Available from: <https://files.eric.ed.gov/fulltext/EJ1154160.pdf>.
- 7) Madhuri GV, Kantamreddi VSSN, Goteti LNSP. Promoting higher order thinking skills using inquiry-based learning. *European Journal of Engineering Education*. 2012;37(2):117–123. Available from: <https://doi.org/10.1080/03043797.2012.661701>.