SYSTEM THINKING ABOUT EDUCATION AT THE DAYALBAGH EDUCATIONAL INSTITUTE

The Dayalbagh Educational Institute has been evolving, progressing and adapting to the changing time while remaining strongly pivoted to the DEI education policy 1975. Today, when the educated elites find themselves helpless in coping with the stress of modern life, the educational policy of the DEI lays foundation to make learners understand the system of which they are a part. Institute wide core courses at the undergraduate level facilitate interaction with surrounding social, ecological and economic system, which helps in molding personalities who look for causes and solutions. Through system approach to education and opportunity to experiment with nascent ideas, the student also develops a realization that decisions are based on mental models derived from observation and experience and such mental models are liable to common faults. The flexible and innovative education system at the DEI, instils pragmatism and confidence in the students to shape their own future through plans that are neither 'over-reached nor 'under-achieved'.

Benefits of the system approach in higher education were also foreseen by visionary academicians like Prof. Kelkar, Prof. Keshevan, Prof. Raja Raman, Prof. Agashe to name few, who integrated the study of social system and basic sciences along with engineering systems, this approach gave wider knowledge base to the young engineering graduates at IITs and gave them edge in solving complex social problems economically by using local resources.

DEI has also followed the approach and has created an ecosystem that encourages innovative small ideas from young students on socially relevant problems and facilitates interaction of these 'idea quantums' leading to innovative frugal or jugaad solutions. This approach to harness frugal innovation at DEI is called 'Quantum Jugaad' and has led to the creation of many student-run on-campus enterprises.

DEI aspires to be an entrepreneurial university and the meaning of entrepreneurship at DEI is not venture creation but is creation of value for others which can be a venture, social or environmental change that is beneficial for masses. Educational framework at DEI is dynamic with strong interaction between six educational sub-systems:

1. School education
2. Vocational Education
3. Technical Education
4. Open Education
5. University Education
6. Entrepreneurial Education

In DEI, the above six systems, despite being distinct are well knit with interactions that have led to new opportunities and horizons and have provided mobility to the learners to move from one system to the other through multiple entry and exit, thus giving them an opportunity to widen their experiential and scholarly knowledge with a holistic approach to problem solving. Since no system is absolute, therefore, evolution through innovation would take place in time and space, both. The continuous changes are accepted in the DEI system through DEI Quantum Jugaad approach so that economy, flexibility and freedom built in the system can be fully exploited to

benefit the stakeholders. This approach leads to higher order efficiencies playing their role to minimize resources and financial needs. In addition, local and global benefits can be expanded at low cost. Value addition using frugal (Jugaad) approach in the education system leads to optimal utilization of ideas, technologies and human resources. DEI quantum Jugaad approach has facilitated skill to entrepreneurial environment for students with no means to get educated.

This approach of DEI completely conforms to the philosophy of Unifying Knowledge and Mobility, and Return to the "Renaissance Man" by Jay W. Forrester (MIT). He was of the view that a person with understanding of the systems tries to see common elements in diverse settings and therefore creating transferability between diverse structure. He strongly believed that due to systems approach in education, the underlying unity between fields becomes teachable, he further advocated the concept of the "Renaissance Man," who has broad intellectual interests and is accomplished in areas of both the arts and the sciences.

Prof. Thomas Kailath (Stanford) also describes the advantages of linear systems modelling approach that helps in identifying signal (opportunities) in a multichannel environment (strongly interacting and dynamic system). He is of the view that this approach forms a continuous basis for optimization and minimizing of resources, energy and economy. It is noteworthy to mention the implementation of such system thinking approach in defence systems by Prof. Atre and its benefits are apparent to all.

The fuzzy and dynamic system-of-systems modelling approach is known internationally to handle subjective, uncertainties of real life and blurring the boundaries between disciplines of academia, industry, society and has created new multidisciplinary and transdisciplinary horizons that are relevant to the need of the time. Having adopted this approach, DEI has come up with a framework to support students with 'No Means' to get educated and become successful entrepreneurs who can create values for others.

Prof. Jamshidi (University of Texas). He is of the view that methods of education must be refined and expanded to meet the changing needs from a system to a system-of-systems vision, from a disciplinary to a multidisciplinary outlook, from a mass production to a mass customization focus, from a steady state to a real-time perspective, and from an optimal to an adaptive approach. These features are in practice in DEI and are responsible for innovative programs.

Addressing the grave challenges of cybernetics Prof. V. Rajaraman reiterates the warning given by Norbert Wiener in 1950. He predicted the existence of the automatic factory, argued that electronic computers were thinking machines capable of taking over many human decision-making processes, and cautioned that humans must not let machines become their masters. Toady, understanding the confluence of cybernetics with liberal humanism has become important to predict the future of mankind. A big question looms before the world *when manmade machine becomes conscious will they have autonomous thinking and resultant morals, or will the designers unconsciously build into Cyborgs their own moral values…? And who we will turn to for proper answers?* Answering these dilemmas Prof. Rajaraman says that commonsense knowledge, religious beliefs, and consciousness will be the drivers of humanism. This necessity opens a new transdisciplinary dimension to inculcate higher order thought process, adaptability and intuitive thinking.

In view of these futuristic needs, Maharishi University of Management, USA, is imparting consciousness-based education through transcendental meditation that helps in exploring the place of oneself in this universe and promotes brain functioning and better ability to cope up with stress and anxiety.

Sir Roger Penrose on his scientific quest to understand the Universe and higher order thoughts and consciousness and his attempts to relate these topics with mathematics and physics clearly create new opportunities for researchers.

DEI has been pursuing scientific study of consciousness and is advocating ultra-transcendental meditation. This new horizon is giving way to new system thinking on material minimalism and sustainability. Today, DEI is leading in the much-required futuristic area of consciousness studies, which is yet to become part of formal education elsewhere.

It is evident that systems thinking can expand the external and internal experiential learning of students and integration of systems and their interactions through subtle interconnection can lead to dynamically evolving system of systems that will open new vistas for holistic learning.

SYSTEM OF SYSTEMS APPROACH OF DEI