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INNOVATION-CENTRIC PHILOSOPHY AND EDUCATION PROCESSES IN TECHNOLOGICAL EDUCATION

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Abstract

Globalization has location countries in insistent and general style. Immature nations are in catch-up phase, rising nations are in spirited phase and the intricate nations are in magnificent stage with admiration to convinced technologies. Modernism — Technological, industry and learning — is imperative for sustainable socio-economic development. Learning innovation is source for technological and commerce novelty. With the arrival of Information and declaration Technologies (ICT), curricula, style of education and education — knowledge methods are undergoing foremost review. There is attitudinal difference amid digital local learners and digital migrant teachers. Engineering learning needs revisiting curricula and pedagogy. Information success, guided/unguided, skill development, replicated/hands-on, and anxiety about civilization are division of Teaching-Learning processes. Innovation-centric learning radar is available that relates four key range: Offerings (What), Beneficiaries (WHO), Processes (How), and Presence (Where) appraisal and guarantee bodies in different countries for senior technical learning place high heaviness age for Teaching-Learning processes. Improvement wants to be fostered amid students and teachers through Teaching-Learning (T-L) processes. Whole novelty that may comprise laboratory based prepared innovation and Jugaad/unstructured natural novelty wants to be promoted for rapid entire growth. Bridging occupational training with engineering learning is also advocated to meet enormous authority of excellence technicians and engineers with capitalist traits. Complete innovation will hasten complete development of the country. Ladder to complement novelty may comprise curricular reforms, aptitude augment, extensive educational leadership, support restitution on higher standards, innovation-conducive pedagogy, adopting a village for overall growth, proficient message.

Keywords: Inclusive Innovation, Jugaad, Innovation Index, Competencies, Assessment of Engineering Education.

Introduction

1. Modernism for Sustainable Development:

Novelty enabled human beings to alter their Society from Tribal to Agrarian to trade to rising Knowledge-based society.

1.1 Novelty in Concepts to assemble:

What's innovation? The connected concept conditions are novelty, innovation, jugaad, invention, discovery, and entrepreneurship.

- Originality involves generating new opinion or concepts.
- Innovation is triumphant effecting of creative/novel ideas in specific situation having crash on economy and society. Modernism may be connected to improvements in competence, efficiency, class, competitive positioning, etc.
- Creation is verdict or constructing absurd new out of box.
- Detection is verdict amazing new in the scenery.
- Jugaad may mean to novelty that may not willingly be explained in prearranged manner. Such novelty may be complete even by untaught workers.
- Entrepreneurship is the ability to exploit change as occasion to create new commerce/repair.

Triumphant entrepreneur aims at tall and tries to make value to modify fabric into “resources”. What's jugaad? Jugaad is a new term for shapeless or instinctive novelty. It is an Indian word for charming completion of creative opinion to advance productivity, worth, competence, etc. This is frequently done by semi-skilled workers. They bottom on natural approach rather than adopt well shaped procedures. Preparing vehicle parts, repairing mobiles and electric gadgets are some examples of jugaad. But each act of getting acceptable product/service/solution will have a set of well-formed events. Jugaad is viewed as fastidious skill owned as contained information. Change of contained innovation (jugaad) into overt innovation is achievable task and it will add to economy. It will also open up avenues for identifying necessary skills and organizing teaching programs for skills maturity. How will innovation have impact on the society? Globalization has kaput walls to cross borders. This will force culture to mingle to set into balance. Improvement is a feature of communities that brings them in the vanguard of technical advancement with economic gains resultant into better excellence of life. Countries with superior novelty index growth on the path of sustainable increase. They are often givers quite than borrowers. They export more than introduction. It is innovation of stereo that made Sony usual. Novelty of iPod/phone swung souk share towards Apple harvest. Of course, linked with industrial innovations, there is need for modernism in business practices as well. We may study innovation index of dissimilar countries and look for necessary factors that pledge to increase modernism.



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2. Technical Education in 21st Century

In the emerging information-based people, there is blast of in turn, easy contact to multimodal in sequence with a combination of study tools, informative view is not what learnt but trouble solving abilities — critical opinion, critical abilities and soft skills. What are the obstacles? Interruption, profusion of in order, unfairness in curricula, stereotyped appraisal methods are a few obstructions often cited. Net sense students often nonsense the classes. Reappearance the coursework is their shared endeavor. At the time of obligation industry finds students weak in basic directive concepts and poor in communication. Typical commentary is made as follows:

- Scrawny in dangerous sciences — Physics, Mathematics and Chemistry.
- Basic concept of core engineering directive subjects is not obvious.
- Terminology snippets as bundle of jargons. Semantic aspects of engineering conditions are not clear.
- Poor (English) message skills.
- Sympathy to society is very low. Communication with ample is absent. There is no small scheme in local tongue.
- Multilingual computing is not introduced.
- Center on R&D is negligible.
- Use of open technologies/principles is not positive.
- Teaching-Learning processes are not innovation-centric.
- Concentration for higher learning or entrepreneurship is missing.

2.2 Pedagogical Approaches

There is lot of prose discussing innovation in a company, firm or relationship. novelty requires serious and systems belief, cognitive dissonance by recognizing inadequacies and constructivist advance of creating new ideas with information from experiences. Innovation association is imminent area. But the root of mind-set buildup for innovation dishonesty in education in schools, colleges, institutions and universities. Reforms in curricula and teaching-learning processes (Om Vikas, 2010) are often suggested. Sanjay Goel (2010) in his PhD thesis discusses many such issues particularly with reference to Software growth Education. Instructional intervention, structure of educational engagements, cognitive dissonance, systems approach, constructivism approach, critical thoughts skills, etc are discussed in the context of learning. Vijay Vaishnavi et al., outlines a multi-dimensional structure to celebrate the characteristics of teacher.

2.3 Imbalance in Curricula

IIT Kanpur tale (S. S. Prabhu, 2000) on engineering curriculum review discusses conclusion of 1st Review (1970–1972), 2nd Review (1979–1981), and 3rd Review (1990–1992). Until 1980 the duration of the BTech agenda was 5 years. From 1981 beyond the duration of B Tech agenda was abridged to 4 years. This overstated the proportion of the Humanities & Social sciences (~20%), Maths & Basic Sciences (~25%), Engineering sciences (~25%), Engg learn & plan (~25%), and Electives (~10%) with individual reduction in Maths & Basic Sciences to ~40%, and HSS to ~37%. Four elective streams were recognized with core and soft center electives. Most of the professional courses were retained. In 5-year BTech agenda, there were 8–10 HSS courses formation up to 16%–19% of the curriculum; this got abridged to 4–5 HSS courses that is about 10%–11% of the 4-year BTech brochure. It is to notice that a good HSS content is essential for a well-rounded engineering edification.

3. Skill Proficiency Spectrum:

Countries labor power in (20–24) year's age underwent the proper industrial training: India (5%), Mexico (28%), industrialized nations (60%–80%), Korea (96%). China has 500,000 senior top secondary industrial schools, whereas India has on 5,100 ITIs and 600 VET schools. India's implausible potential is demographic surplus. Working age inhabitants will be 63% by 2016. There is wide gamut of skill increase starting from diploma to certificate and degree level programs.

3.1 Issues connecting to VET

Challenges to tackle in the crate of VET (Vocational learning & Training) include:

- Disconnect with provide and insist of skills
- Curriculum lag following the require of industry
- Poor class of occupational training
- Lack upright mobility and reassign of praise.
- Low position attached to vocational guidance
- Industrial training and vocational education are dealt with separately
- Lack scheme skills in all VET programs



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- Poor statement skills in rising nations there are often separate Government departments/ministries to plan and sustain vocational preparation, vocational learning and engineering education respectively. Occupational training remnants precise and incurable program.

This is opted upon stoppage in receiving admission in engineering learning. Students from reasonably poor families also opt for vocational training. In the case of vocational training, admissions are simple to get at even lower score ranks, fee is low, most of institution is support by government, and forceful environment is absent. The intake is disheartened. This is national psyche about occupational training. Whereas in the case of engineering education admission is tough, fee is high, job forecast are profitable to get white color jobs, there is probable to increase premature in management cadre, there is usual check on quality of education. Large number of institutions is in confidential sector that creates a forceful environment. Intake to occupational education is largely Right brain main who would be good in doing things by hand, and good in inspiration. Intake to engineering learning would be more towards Left brain occurrence that is they would be good in study, logic, and intend. Society would benefit of the unified mix of both of these. Trainability is human feature. It is, therefore, proposed to connect up these programs with optimism having theory that “skill precedes knowledge”. That means, ahead acquiring sensible skills one would be inquisitive to know discipline behind such sensible projects/applications. We need to machine bridge course to convey up the vocational training pass-outs to be commendable of receiving into engineering directive. They would be curious of learning science in vocation. Their presence would recover generally practical aspects in laboratories throughout peer-interaction.

3.2 Issues concerning to Engineering learning

- Engineering learning is relocate from Vocational Training (VT)
- There is no straight vertical mobility in the case of occupational training. Of way they may first get into 2nd year of Polytechnic (3-years program) and the Polytechnic pass outs in 2nd year of B.Tech (4-years program).
- Engineering graduates lack ability for levelheaded aspects of building, commission and difficult possessions.
- HSS (Humanities and Social Science) satisfied in the Engineering curriculum is low.
- Teaching-Learning processes usually don’t emphasize on modernism, exploratory education and constructivist come close to.
- Sympathy towards “relevance to society” leftovers miserable low.
- There is force more on Lectures (theory) and less on Practical’s. Trade is not much fervent to inform industrial training/internship for less than 6 months. Business likes to get trainees on usual basis so as not to disturb their normal pipeline behavior rather to augment this.

3.3 Bridging occupational teaching and Engineering edification:

- upright mobility from ITI level Vocational training to degree level BTech Program in Engineering learning will, in the long run, convalesce practical talent and excellence of crop, processes and military resulting upon the hypothesis:

“Skill precedes information”.

- How to do it? viaduct Course of 2 Semesters is recommended:

Sem1: 1. Basics-I of Physics, Chemistry, Mathematics

2. Impending skills (English)

3. Superiority & principles

4. Vocation-specific Group scheme

Sem2: 1. Basics-II of Engineering Physics & Engineering Moths.

2. Impending English.

3. Science in vocation (case-study based).

4. Interdisciplinary professional Group Project.

3.4 Evaluation Methods

Evaluation is future at testing value in building information, skill and approach in Cognitive, Psychomotor and touching domains respectively. Usually, cognitive tests are accepted out in classroom and skill tests in the laboratory. Advance is viewed as custom in the long run. It is beautiful to test the concepts and co-related concepts and complexity solving ability. Surprise quizzes, open book quizzes, time-bound team actions, and mutual projects may be more effective. Peer-evaluation will be motivational and make them more responsible. Evaluation should NOT be planned to test their deficiency and weaknesses. Evaluation must ultimately result into optimistic learning and assurance. Evaluation needs to be fixed in the teaching-learning practice. Incessant and complete Evaluation may include 2–3 formative tests and a collective test. Modernism may be considered other ability to be encouraged. Puzzles, group discussions moreover team projects may excite them to think artistically.

3.5 Engineering Education preparation: To Groom up college



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Leaders presently, fresh B.Tech start teaching at B.Tech level, fresh M.Tech at M.Tech stage due to scarcity of manpower. There is no program equivalent to Bachelor/Master in Education for engineering graduates. The modular (trimesters) Program is optional for direction of fresh engineering graduate teachers. The satisfied covered will comprise

- Basic concept of Sciences: Physics, Chemistry, Mathematics 25%
- center Concepts of Engineering Science (case-study based) 25%
- Teaching-Learning Processes/Pedagogy 20%
- specialized Communicative Skill 10%
- Managerial Skill 10%
- Life organization & principles in Engineering 5%
- Project: High Tech solution in Low-Tech Environment 5%

9. Conclusion

Modernism is path of development and satisfaction. Innovation is sown and sprouts in learning institutions; grows and blossoms in work place — manufacturing, government or academe. Inventive ability may be urbanized Innovation-centric Teaching and education Processes in Technical Education and groom up. Innovation may be viewed as multi-dimensional activity between donations (What), beneficiaries (Who), process (How) and points of attendance (Where). Novelty may be categorized as open or closed. Open novelty includes business model to make worth and promotes purposive inflows and outflows of thoughts, information and proficiency. Innovation in education is of open type utilize internal (syllabus-based, in-class) and exterior (beyond syllabus, visits & interactions) knowledge and skills. Team projects and common communication to provide affordable solution will inspire innovation in affective domain. Approval boards are yet to come out with sufficient quantifiable indicator for innovation-centric teaching-learning processes. Largely grading system should maintain in thought the law of diminishing returns and should alter from linear scale to non-linear scale. It is prospect to present direct Vertical Mobility to ITI pass-outs of occupational Training through a viaduct course to get into engineering program. The instructive institutions may take up study of skill sets in Jugaad or formless/intuitive innovations and increase framework to rebuild technologically. The increasing nations will really benefit of unstructured innovations and original ideas of people. Future lies at the bottom of pyramid. Pioneering society at great will produce the fortune. Innovation-centric T-L processes require to be promoted in schools, colleges, institutions and universities.

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