Corporate Strategies and Practices in Engineering Education Transformation

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Leadership Summit, IUCEE
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Setting the Context

- Many ideas and techniques are playing important roles in transforming engineering education

- An important problem to address - unemployment and brain-drain in Tier-2/3/… cities of India

- BVB-College/KLE-University has been a leader in experimenting with innovative methodologies in engineering education

- Experimented with new approaches

- Achieved encouraging successes over the past 3-4 years

- Will give perspectives of the processes and systems put in place CTIE (Center for Technological Innovation and Entrepreneurship) – using corporate principles and guidelines – as an illustrative example

- Had opportunity, and privilege, of being Chairperson of CTIE
Understanding the Landscape - Some Questions

• Can academic institutions impact economy and employment?

• Can we develop a model which enables
  • institutions to develop entrepreneurial eco-system to drive the economic development?
  • building a model that can be replicated across India?

• Can we make changes to engineering education to
  • expose undergraduate engineering students in various aspects of entrepreneurship?
  • introduce interventions throughout the 4 years?
  • enable a student knows if he/she is cut out to be an entrepreneur?
  • encourage student/alumni start-ups?
  • create incubation platform, connect with local industries/economy, etc?
  • enable student “test the waters” BEFORE graduation, and avoid societal pressures/stress?
Hopeful Outcomes

- Address unemployment bringing in self-employment as a practical alternative
- Set up a scalable model for engineering education in Tier-2/3/.. Cities and institutions
- Help students realize their true potential and aptitude
- Demonstrate practicality of self-employment through entrepreneurship
- Define program interventions for introducing entrepreneurship perspectives in course curricula
- Redefine aspects of engineering education
- Encourage students to think “out-of-the-box”
- Enable, and incubate, start-ups
- Encourage product/system developments
- Achieve a desired conversion of ideas/projects into start-ups
- Enable incubating companies to be VC’s ready
- Develop all-round capabilities in business development, financial planning, technology translation, ..
- Contribute to local economy
- Institutionalize “Make in India”
Realization of a Game-Changing Initiative

Employing Corporate Principles
Strategic Corporate Methodologies - 1

• Scoping the Scenario
  • Large number of engineering colleges/graduates, limited employment opportunities
  • Migration to big metros/cities, social and environmental issues
  • Tier – 2/3/…. towns depleted of talent
  • Local industries starve of human resources
  • Students usually venture into entrepreneurship AFTER graduation
  • 2-3 years of investment to decide if suitable as an entrepreneur
  • Family, peer, financial pressure and responsibilities
  • Difficult to get back into main-stream, time/financial/career loss

• Baselining Desired Solutions
  • Arming” the students BEFORE graduation
  • Exposure to ALL aspects of entrepreneurship (tech, financial, biz planning, …)
  • Help students to realize their (non)potential as entrepreneur while studying
  • Avoid all pressures and losses
  
  • Make “Entrepreneurship” integral to engineering education
  • Enable students to discover” themselves early enough for career decisions
    • Need focused changes/approach in engineering education
  • Integrate through-out the 4 year undergraduate engineering program
• **Identifying Initial Steps**
  - Identify success stories from other institutions
  - Adapt/modify to specific local parameters
  - Analyse feasibility with realistic expectations
  - Identify critical dependencies

• **Groundwork to Setting Roadmap**
  - Doing a **SWOT** (Strengths, Weaknesses, Opportunities, Threats) to identify critical care-abouts
  - Setting up Vision, Charter
  - Brainstorming sessions
  - Identify **SMART** (Specific, Measurable, Achievable, Relevant, Time-Bound) goals

• **Setting Strategic Goals**
  - Be a pioneer and role-model in tier-2 education, get recognition
  - Help students on path to self-employment
  - Add to local economy
  - Bring about industry synergy
  - Incubate, nurture and grow start-ups
  - Institute an appropriate governance structure
  - Identify Challenges and Risks, with Mitigation Plans
Strategic Corporate Methodologies - 3

• Defining Governance, Ownership, Responsibilities
  • *Commitment from top-management*
  • Dedicated full-time “CEO” for the initiative
  • Active and passionate governing “board”
  • Suitable empowerment
  • Committed funding and infrastructure

• Identifying Focus Areas
  • All-round exposure to students
  • Business development
  • Financial planning
  • Technology translation
  • Customer interface
  • Incubation guidelines
  • Industry orientation

• Monitoring/Tracking Progress
  • Well defined targets
  • Regular status reports and updates
  • Scheduled “board’ reviews
Ensuring Stakeholders Involvement
- Students integral to running and success of the program
- Active involvement of faculty, students
- CIPD and “Makers Factory”
- Industries and industry bodies
- VCs
- Management involvement and participation
- Appropriate course corrections, as needed

Institutionalizing Processes
- Program content definition and integration
- Interface with successful universities
- Student participation dynamics
- Evolution of capabilities – ideation, pupa, butterfly, capstone
- Funding for infrastructure, incubation
- Industry synergy
- Faculty involvement
- Workshops, business demonstrations
- Prototyping and product development
### CULTIVATE

**Create and Sustain a Culture of Discovery & Innovation**

**Inspiration**

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**CTIE STRATEGIC FRAMEWORK TO DEVELOP NEW VENTURES**

An Ecosystem-Based Process Model for Creating and Sustaining World-Class Business Ventures in a Technical Institution

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<tr>
<th>CULTIVATE</th>
<th>CREATE</th>
<th>ASSESS</th>
<th>PREPARE</th>
<th>LAUNCH</th>
<th>MANAGE</th>
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<tr>
<td>Create and Sustain a Culture of Discovery &amp; Innovation</td>
<td>Solve a Meaningful Problem by Inventing a Valuable Solution</td>
<td>Verify Feasibility of Building a Business Around the Invention</td>
<td>Identity Key People and Financial Resources Needed</td>
<td>Finalize Planning and Launch the Business</td>
<td>Grow the Business and Optimize Performance</td>
<td>Celebrate Impact on Personal, Local and Global Ecosystem</td>
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#### Metrics

- **1. Institutional Commitment**
  - Strategic
  - Financial
- **2. Core Competencies/Outcomes**
  - Research Priorities
  - Educational Priorities
- **3. Talent**
  - Motivated & Supportive Faculty
  - "Entrepreneurial" Students
- **4. Innovation Infrastructure**
  - Accessible Facilities & Equipment
  - Case Study Projects
- **5. Interdisciplinary Collaborations**
  - Research Clusters
  - Product Design & Realization
- **6. Intellectual Property Policy**
  - Protected as Fair and Balanced
  - Intellectual Property
- **7. Student & Faculty Networking**
  - Conferences & Symposia
  - Competitions & Challenges

#### SBU Programs

- **PUPA, Ideation Camp**
  - PUPA, Ideation Camp, Butterfly, Case Studies Projects, E-Source, Student Exchange Program
- **IP Policy Familiarization**
  - PUPA, Ideation Camp, Butterfly, Case Studies Projects, E-Source, Student Exchange Program
- **IP Creation and Protection**
  - Intellectual Property Valuation

#### Intellectual Property

- **Annual Fund, Sponsorships, Grants**
  - Personal Savings & Credit
  - Family – Friends
  - Grants
  - Crowdfunding
  - Pre-Sale Deposits
- **Creative Ventures**
  - Grants
  - Angel Investors
  - Venture Capital
  - Mentors, Marketing, Sales
  - Manufacturing, Product, Sales, Customer Service & Quality
  - Alumni Networks, BIVB Tech Park

### WARNING SIGNS

- **Arthritis (APATHY)**
  - No Enthusiasm
  - No Motivation
  - No Willingness
- **Insomnia**
  - No Restlessness
  - No Practical Recklessness
  - No Creativity
- **Dead-Ends**
  - No Creativity
  - No Practical Recklessness
  - No Enthusiasm
- **Delusions**
  - No Practical Recklessness
  - No Creativity
  - No Motivation
- **Roadblocks**
  - No Creativity
  - No Practical Recklessness
  - No Enthusiasm
- **Failure**
  - No Practical Recklessness
  - No Creativity
  - No Motivation
- **Losing**
  - No Practical Recklessness
  - No Creativity
  - No Motivation
- **Unsatisfactory Achievements and Questionable Results**
  - No Practical Recklessness
  - No Creativity
  - No Enthusiasm

**CTIE Technology Incubation**

**Venture Stakeholders, Wealth Management, & Community Outreach**

**Alumni Networks, BIVB Tech Park**
• Communication and Outreach
  • Active and up-to-date website
  • Participations in seminars, workshops, conferences
  • Joint collaborations with industry and academia
  • Government recognition and support (TBI)
  • Help other academic institutions
  • Encourage successes from idea → product → start-up → business

• Ensuring Continuous Improvement and Growth
  • PDCA model (Plan, Do, Check, Adjust/Act)
  • Course correction roadmap (metrics, timelines, ...) as needed
  • Expand the ecosystem – integrating
  • Participations in seminars, workshops, conferences
  • Integrating CIPD (Center for Innovation and Product Development)
  • Introducing MINOR in “Entrepreneurship”, as well as in “Product Development”
  • Bringing in “inter-disciplinary” perspective
Summary

- Set up a transformational model in engineering education for any tier 2/3 cities
- Defined high-impact educational changes
- CTIE is now a Govt of India recognized TBI
- Demonstrated that entrepreneurial ecosystem as part of undergraduate program
- Witnessed the changing “culture” of the campus
- Helped students identify and nurture their entrepreneurial potential
- Enabled students to bridge gap between engineering/technological solutions with business opportunities
- Created awareness amongst students (from Tier 2) cities to experience entrepreneurship, and realize its potential for self-employment
- Empowered students through experiential learning interventions
- Helped students explore new avenues without compromise on career, growth
- Helped to retain talent in local ecosystem – in industry, and society
- Set up processes in place which are scalable with the institution
- Demonstrated success of model which can be adopted/adapted by other academic institutions across Tier2/3/.. Cities

This process holds for any new strategic initiative
Think about it & Thank You Very Much
Objective:
The minor in entrepreneurship enables students to ideate, build and grow their own start-ups through experiential learning.

Value Proposition:
- Rigorous mix of theory and practice
- Interactive learning environment: team-based projects/activities
- Facilitates networking, interaction with entrepreneurs and investors
  - Help build start-ups

4th. Semester
- Principles of Innovation and ENTR

5th. Semester
- Managing Innovation
- New Products and Services

6th. Semester
- Finance and Mktg for Emerging Enterprises
- Starting a New Venture

Minor in ENTR

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Objective:
Our goal is to educate next generation of product developers and innovators — people who are able to work across domains and industries, identify convergences, and create impact through innovative designs and product development.

Value Proposition:
- Experiential product program based learning
- Holistic approach to problem solving using engineering, and business skills
- Understanding of customer product preferences and market dynamics
Interventions with Students

First to Final Year Entrepreneurial Experience

Pupa – An Accelerated Entrepreneurship Experience

Butterfly – A Technology B-plan contest

All semesters

Product Design – A hands-on experience in product building

IV sem

Tech Innovation & Entrepreneurship

VII sem

Business Idea Capstone

VII- VIII sem

INTEL ideation camp – From Idea to Pitching

CTIE Incubation

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