

Proceedings
Teaching Entrepreneurship to Engineering
Students

Engineering Conferences International

Year 2003

Conference Summary

Russel C. Jones
World Expertise LLC

Bethany S. Oberst
James Madison University

Conference Summary
by
Russel C. Jones
and
Bethany S. Oberst



Teaching Entrepreneurship to
Engineering Students
Monterey CA January 12-16, 2003



Outline

- Summary of ideas
- Unanswered questions
- Where do we go from here?



Summary of ideas

- Attributes of entrepreneurs
- Role of universities
- Academic programs
- Role of industry/practitioners
- Sources of funds



Attributes Exhibited By Entrepreneurs


- Worked for big company, then quit
- Lone ranger
- Persistence, perseverance
- Disciplined
- Confident, self reliant
- Breadth of education
- Basic business skills
- Starts young
- Calculated risk-taking


- 
- Opportunity driven, opportunity assessment skills
 - Team building skills
 - Strong technical skills
 - Appreciation of mentorship
 - Ability to manage growth
 - Good listener
 - Generalist
 - Common sense
 - Social interaction plays role
 - Entrepreneurs play “not to lose”
 - Serial entrepreneur



Faculty View Of Attributes Of Entrepreneur

- Risk takers
- Inventors/innovators
- Rule breakers
- Fresh eyes
- Disrupt status quo
- Multi-disciplinary
- Problem solver


- 
- Communication skills
 - Appreciation for context
 - International orientation
 - Optimistic, redefines failure
 - Leadership
 - Tolerance for ambiguity
 - Need for achievement
 - Visionary
 - Drive for commercialization

- 
- Attributes of entrepreneur are diametrically opposed to those of engineering faculty
 - Intrapreneurs succeed best in corporations which have a risk-taking attitude (e.g. make sufficient R & D investments)



Role Of Universities


- Commercialize R&D
- Spawn startup companies
- Train entrepreneurs
- Establish rules for intellectual property
- Provide incubators, technology parks
- Provide services to alums
- Need to chose appropriate academic models and operating policies

- 
- Impact of personnel policies
 - Conflict of interest policies
 - Workload policy
 - Create teaching certification for adjuncts
 - Patent royalty distribution policy
 - Seed stage funding
 - Cross-college collaboration



Academic Programs

- Course stream over four years
- Backbone project through four years, instead of capstone
- Expose all engineering students to elements of entrepreneurship, embedded in curriculum; elective courses in depth
- Residential experience
- Is entrepreneurship a niche or part of the core?
- Graduate or undergraduate?

- 
- Co-curricular activities (clubs, boot camp, meet and eat, ...)
 - Option or minor
 - Joint engineering/business program (e.g., Engineering PhD + MBA team)
 - Internet based learning space
 - Competitions for seed funds
 - One day event
 - Experiential learning
 - One semester survey course



Role of industry/practitioners

- Consultation services to small businesses
- Incubators, technology parks
- Student interns
- Entrepreneurs as instructors/lecturers
- Industry mentors for students
- Continuing education for industry employees
- Preparation of students for entrepreneurship or intrapreneurship



Sources of support

- Government grants (NSF, Dept. of Commerce, ...)
- Institutional resources
- Industry contribution
- Foundation support
- Organizations (NAIIC, ASEE, etc.)




Unanswered questions

- Intrapreneurship vs. Entrepreneurship
- What should every engineering student get/know?
- Reward structure for faculty
- Role of adjuncts, industry returnees
- IP policies
- Assessment
- High-tech vs. Low-tech



Where do we go from here?

- Another conference?
 - ECI? ASEE? NSF? Etc.
 - Every year? Every ... years?
 - In US? Overseas?
 - Bring together business school and engineering faculty?
- Role of NSF?
- Summary paper/article on this conference?
- Website? Listserv?

- 
- Workshops for engineering faculty on principles of entrepreneurship?
 - Planning meeting at ASEE annual meeting?
 - Survey alums
 - How many are entrepreneurs?
 - What do they think is needed in curriculum?
 - Each participant go home and do something?



Contact info

- Russ Jones RCJonesPE@aol.com
- Bethany Oberst oberstbs@jmu.edu