EPICENTER
research summit

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Research on Curricular Approaches

Moderator: Nathalie Duval-Couetil, Purdue University

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National Center for
Engineering Pathways to Innovation
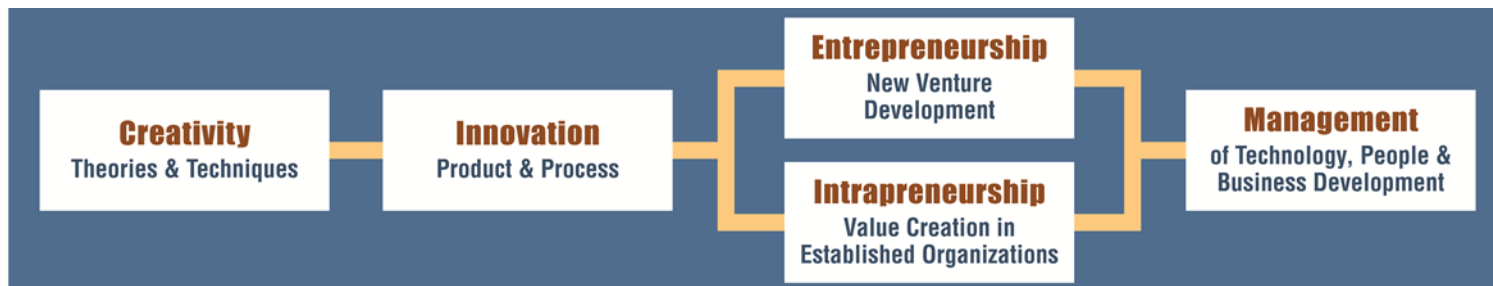
NSF Stanford University

NCIIA

Panelists

Erin McDonald,
Stanford University

Mark Schar,
Stanford University

Angela Shartrand,
NCIIA

What are we teaching?!?

Creativity
Theories & Techniques

Innovation
Product & Process

Entrepreneurship
New Venture Development

Intrapreneurship
Value Creation in Established Organizations

Management
of Technology, People & Business Development

What are the top priorities? For what outcomes?

Interviews with Young Engineering Entrepreneurship Alums

What are their perceptions of the value of entrepreneurship skills and knowledge to their current jobs/careers?

Main themes identified:

1. Communication skills and business literacy
2. Seeing the "Big Picture"
3. Working with others outside the discipline of engineering
4. Helping graduates obtain jobs
5. Entrepreneurial mindset or way of thinking

Duval-Couetil*, N. & Wheadon, J.† (2013, October). The value of entrepreneurship to recent engineering graduates: A qualitative perspective. Paper presented at ASEE/IEEE Frontiers in Education Conference, Oklahoma City, OK.

"It was the first introduction I had to anything business related, and so, whether that's how to value your own services, *how to talk to clients, how to go out and ask the right questions when you're trying to get feedback*... that I do on a day-to-day basis still."

"*It's just a way to get organized* ... going through that business development plan and say, OK, what's your value proposition? What's your target market? What's your budget? How do you expect to get funding? And really *being able to answer these in a concise, organized sort of way*."

"The things that a typical engineering student does while they're in college are very one-dimensional ... there isn't a lot of ... practical application ... I kind of wish there was more of that. [Entrepreneurship] *helps me sort of look at things from more than just an engineering standpoint*. It helps me realize there's more to a business than product constraints."

What approaches are we using?
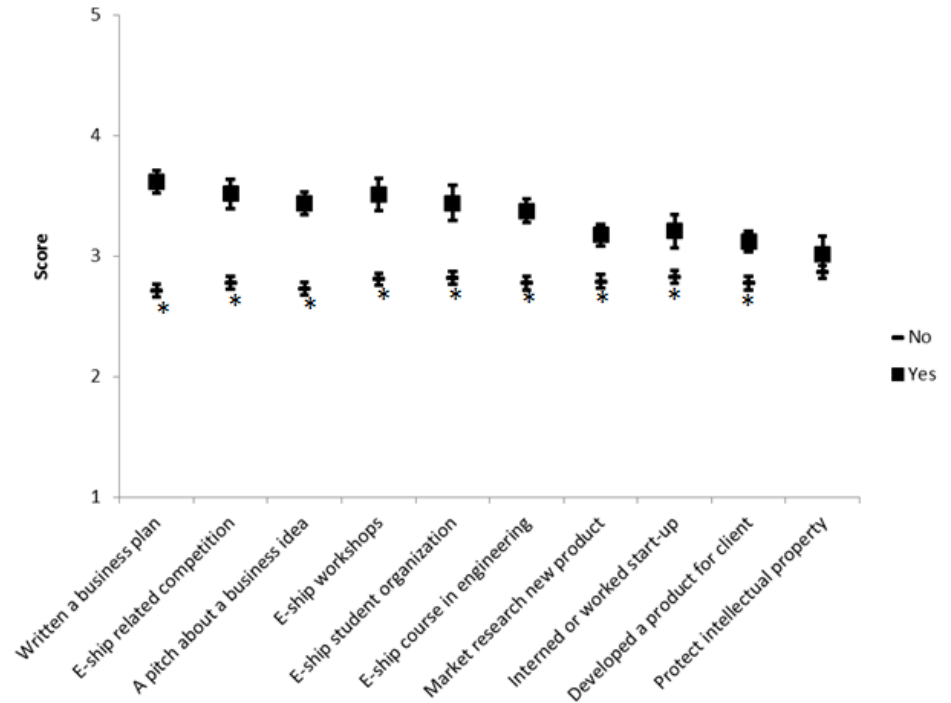
Lecture

Experiential

Case studies

Embedded models

versus

Add-on modules
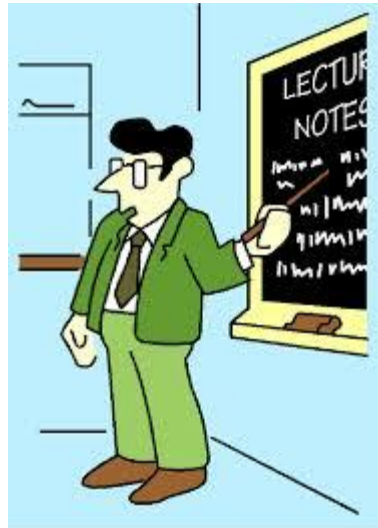
Who is teaching them?
How do we know they work?

Role of extracurriculars, environment and ecosystem

Student ratings of their "overall entrepreneurial ability": Comparisons based on participation in entrepreneurship-related experiential learning or extracurricular activities during college. *Indicates students' ratings are significantly lower than students who participated in experiential or extracurricular activities during college ($p<0.01$).

Duval-Couetil, N., Shartrand, A. & Reed-Rhoads, T. (In press). The role of entrepreneurship program models and experiential activities on engineering student outcomes. *Advances in Engineering Education.*

For which populations?

40% of students in the multidisciplinary entrepreneurship at Purdue have parents who are entrepreneurs

Sample of 501 engineering students at three institutions

| Item	No e-ship courses Agree %	One or more e-ship courses Agree %	p
Entrepreneurship education can broaden my career prospects and choices	69	82	0.000
I have a general interest in the subject of entrepreneurship	59	79	0.000
I would like to learn about entrepreneurship in my engineering courses	60	78	0.000
I am interested in taking entrepreneurship classes	47	71	0.000
I would like to know if I have what it takes to be an entrepreneur	57	65	0.023
I want to become an entrepreneur	34	59	0.000
I have an idea for a business product or technology	32	46	0.000

Duval-Couetil, N., Reed-Rhoads, T. & Haghighi, S. (2012). Engineering students and entrepreneurship education: Involvement, attitudes and outcomes. *International Journal of Engineering Education 28*(2), 425-435.

Are differences in approaches warranted?

Discussion Topics and Questions

Erin McDonald, Teaching creativity

What works in teaching entrepreneurship, and how do we know it works?

Mark Schar, Embedded models
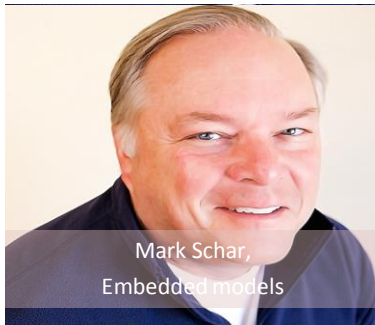
Are different approaches necessary for different student populations?

Angela Shartrand, Lean Launch Pad

What are the top priorities or concepts in teaching entrepreneurship to engineering (or all) students?