Epicenter – Research Community Survey – 2014

SageFox co-developed and administered a survey of the community of I&E researchers in the US in May 2014. The survey sought respondents' (1) feedback on the Team's research questions, including their interest in and the potential import of the findings, (2) respondents' impression of the current state of the research community, and (3) respondents' experience with translating research into practice and using research as a catalyst for change.

Invitations to this survey were sent from SageFox via email to more than 136 key influencers, researchers, and practitioners (forwarding of invitations was allowed, and is known to have happened). A portion of the invitees attended Epicenter research-related session at Open 2012-14, some are members of the Advisory Board, Pathways Teams, others were hand-picked by Epicenter PIs + SageFox as prominent researchers / research groups.

The research questions are:

Research Question 1: What are current models of educating engineers for entrepreneurship/ entrepreneurial thinking?

Research Question 2: What are undergraduate engineering students' entrepreneurial interests, abilities, and achievements? How do these interests, abilities, and achievements change over time? Which educational and workplace environments/ experiences influence the development of their entrepreneurial interests, abilities, and achievements?

Research Question 3: How can fundamental engineering curricula be reframed to stimulate integrative thinking, especially entrepreneurial thinking?

Highlights N = 61 (136 invited). Response rate: 45%

Nearly all (92%) respondents have professional interests which overlap with the work outlined in the research questions (reprinted above) and two-thirds of respondents (66%) are actively engaged in both entrepreneurship and engineering education scholarship. More than half (52%) of respondents' work overlaps with RQ2; and about 30% overlap with each of RQ1 and RQ3. Nearly as many (27%) described their work from the perspective of a practitioner (i.e., not overlapping with any of the RQs).

Approximately half (52%) of respondents work significantly on translating research into practice, and a little more than half offer themselves up as resources in supporting efforts on campus w/r/t entrepreneurial education.

The three research questions, see above, were generally well-regarded by respondents, especially research questions two and three, as important and very important, with 98% of respondents reporting that this research work has valuable and very valuable implications to the fields of engineering and entrepreneurship education.

ecostache@sagefoxgroup.com

SAGEFOX CONSULTING GROUP
AMHERST, MA • ATLANTA, GA

apeterfreund@sagefoxgroup.com

These respondents reported greater levels of success effecting change nearer their spheres of influence (at the department/campus level) than in doing so nationally, reflected in the finding that one-third are engaged significantly on a nationally-oriented, while more than half are working with teams on-campus.

Responses In Detail

How important do you think that the answers to these questions are in advancing entrepreneurship and engineering education	% important + very important
Research Question 1	67%
Research Question 2	92%
Research Question 3	85%

Are you actively engaged in scholarship associated with some aspect of…	% yes
entrepreneurship education	87%
engineering education	74%
both	**66%**

Do your professional interests overlap with any of Epicenter's research questions above?
- 92% yes

Please describe that overlap.

Overlaps with…	n = 52
Research	**71% (37)**
RQ1 (all that apply, of those w/ research related responses)	41% (15)
RQ2 (all that apply, of those w/ research related responses)	73% (27)
RQ3 (all that apply, of those w/ research related responses)	43% (16)
Practice	**27% (14)**
Other	**2% (1)**

RQ1
- I am leading a project to enhance the innovation ecosystem at my university. This addresses faculty, students, university policy, and community
- I have an M.Ed. and my thesis was in (and continues to be worked on by me) whether or not engineers actually make great entrepreneurs based on several definitions of successful entrepreneurs as defined by the real life 5-year experiences of entrepreneurs.
- I'm very interested in different models for teaching entrepreneurship, but not only for engineering students – for all students.
- Examining effective ways to deliver entrepreneurship education to engineers and measuring impact.

RQ1+2
- My scholarship focuses on predictive models explaining entrepreneurial intention in general, and for engineering students. I am presently engaged in the assessment of a half dozen engineering and entrepreneurship education programs

- My research involves studying and developing informal learning environments that exposes STEM students to interdisciplinary collaboration, challenge-based learning, entrepreneurship, and design thinking.
- Currently engaged in research on the first two RQ
- Research Questions 1 and 2
- I am in an ecosystem where we discuss many of these aspects – ranging from the theoretical (what is the value added, what cognitive theories are grounding our approaches) to more practical (is it best to expose students to e-ship in the curriculum or outside of it, or both?). I also have a major interest in the attitudes (what they are, how to measure them, if they can or cannot change in some situations, best practices) that may be instilled as opposed to simply skills and knowledge that may be gained through learning about entrepreneurship.
- I research entrepreneurship education and entrepreneurial learning. Expertise in assessment practice, pedagogy, action learning, experiential learning, extracurricular activity, sustainability of educational practices and how entrepreneurs learn.

RQ1+3

- Research question 1 and 3
- Future of entrepreneurship education, in particular with respect to: impact on (human) capacity development; future-oriented competences; integrated economic, ecological, social and technological development

RQ1+2+3

- These are the major questions that I'm trying to address in my research.
- I am very interested in all three questions. One difference is that I don't think *curricular changes* will help develop students' entrepreneurial abilities. It is actual practice and talking with entrepreneurs and being in a community of students with similar interests that will help most.
- Research interests overlap with these questions

RQ2

- Developing broader STEM, tech and innovation interests into business and entrepreneurial opportunities.
- Improving engineering education so they are both disciplined and nimble, and ensuring the changes are motivating to all enrolled and potential students
- Researching the behavior of practicing engineers
- I am interested in defining and assessing the skills and concepts associated with entrepreneurial activity.
- I work on a project related to the development of entrepreneurship more generally (not specific to engineers, although they are included in our sample)
- Measuring the development of interests, abilities, and achievements over time. what's a good way to educate entrepreneurial thinking and gaining entrepreneurial acting and how (for example Coaching, Mentoring, Projects,…)
- Currently conducting a study of entrepreneurship in young adults.
- Research on entrepreneurship abilities
- Research on students' entrepreneurial interests and activities
- Integrative thinking
- I have interest in student engagement as well as development of tools to enhance hands-on activities

RQ2+3

- How to best facilitate, and assess, innovation (and innovative thinking) in engineering education.
- I am currently involved in several research studies that involve Research Question #2. I am also involved with the assessment of our university entrepreneurship minor, so there is significant overlap.
- Developing curriculum that engages engineers in entrepreneurial practices. Looking for ways to stimulate creativity and motivation
- As a design instructor and textbook author I am interested in knowing the fundamental engineering-related issues of entrepreneurship that should be part of every student's education, even if they are not interesting in becoming entrepreneurs.
- I study undergraduate engineering students' as well as professional engineers' views about and understanding of innovation as process- entrepreneurial thinking is part of this framework.
- Doing research that aligns well with the items in Research Question 2 and 3 but not just for engineering students. For question 2, the students in the study are from across multiple colleges. We can separate out the engineering students. For question 3, we are looking at the influence or impact ABET can have on reframing engineering education to include entrepreneurship and innovation.
- Speaking both personally and institutionally, engineering, entrepreneurship and design are inextricably connected. They, along with a grounding in the humanities, form the basis for engineers to have the ability to not just create cool widgets, but to conceive and realize widgets that solve real human problems. You need all pieces of this puzzle to innovate. Educating innovators is at the core of my research, teaching and professional efforts and interests and efforts.

RQ3

- I am currently working on identifying means to integrate more entrepreneurial style thinking into the core Chemical Engineering Product Design Classes that I am involved with teaching.
- My professional interests focus on the overlap between design and engineering and the role of advanced commercial concepts in improving the hybrid learning environment.
- I am interested in how to promote integrated thinking in engineering, including entrepreneurial thinking, within design courses.
- We educate about 1000 students per year in entrepreneurial courses such as business plan seminars or an E-MBA. We deal with students in every level of their programs. Furthermore we try to establish a new way of teaching by integrating practical projects and hands-on activities into the curriculum of engineering students.

Practitioners

- My institute is heavily involved in engineering entrepreneurship education and I have been personally in the field and teaching engineering entrepreneurship since 2003
- I teach engineering entrepreneurship and work with various students and community members in this area.
- I undertake significant work with the industry in various roles. Most of my students end up working in the industry and eventually want to undertake some form of startup activities. A good portion of my work is also funded by the industry.
- Currently a program director for a share-group that fosters entrepreneurial mindset in undergraduate engineers.
- Lead entrepreneurship and innovation efforts for the College of Engineering
- As a dean of engineering, I have been a strong proponent of the development of entrepreneurship programs on my campus and I have been personally involved.

- Our program is interested in the changing models of engineering education esp. w.r.t. online learning vs. classroom learning, new pedagogies around hands-on learning, etc. We teach in ways we consider innovative, but we have not validated our methods against the research or other programs.
- Professionally I issue and oversee sustainable innovation grants. These grants often serve as the catalyst for entrepreneurial endeavors resulting in experiential entrepreneurial education.
- I am involved with our university's efforts to improve innovation and entrepreneurship education for our undergraduate students.
- I have been teaching an entrepreneurship course with undergraduates for the last 8 years, I have been involved in starting a business accelerator, and I work with local start-ups.
- I mentor student design teams that create solutions and occasionally grow them into ventures.
- trying to establish new innovation and entrepreneurship programming for students inside and outside the classroom
- I-corps
- I hire engineers so the curriculum is very important to the success of business moving forward.

Other
- Entrepreneurship is often associated with open innovation and for the teams working at the Epicenter, this represents an open setting where stimulation of integrative thinking is a potential outcome.

Are there other facets, which fall outside Epicenter's research questions, of research in entrepreneurship and engineering education that are important to you? Please describe.
Assessment
- The relationship between Entrepreneurship Education and Employability. Career Pathway Studies with Alumni
- Assessment of entrepreneurial thinking. Creation of entrepreneurial academic cultures (1. where entrepreneurship programs/students/outcomes flourish, and 2. where the academic organization, programs, and practices are founded in entrepreneurial mindset of design, opportunity, re-creation, etc.)
- Methods to assess the development of an entrepreneurial mindset
- How best to assess the development of student entrepreneurial skills
- I think some of the key questions revolve around longitudinal assessment of the true impact of engineering entrepreneurship education models.
- Yes, how to measure the impact of entrepreneurship education on particular groups. What are the variables that should be measured? How?
- Based on known qualities of engineers that are more aggregated by choosing engineering as a goal, are we just entertaining engineers who get tired of all the math and science, or can their personality traits actually be correlated to those that make great entrepreneurs, a la my research into successful entrepreneurs as mentioned above.
- What are core character traits of successful entrepreneurial students that can be used to tease out which students should focus on traditional engineering curricula v one with a bend to entrepreneurship
- They certainly overlap with the research questions. I suppose I would tend to want to link the questions a bit more to attitudes, but that seems to be happening.
- I also work with the Engineering Education Research Center on providing extracurricular experiences such as innovation challenges and a summer boot camp that help stimulate entrepreneurial mindset in engineering students.

- Integrating arts education: critical and creative thinking and making.
- There is a gap in what is taught in the idea- or product- development process. The students can have very detailed design and business plans prepared. But actually getting things started is not covered. Teaching students to tolerate risk.
- I think the first needs to be understood before the third and others might be fully investigated. The second RQ is important but will be a moving target.
- Methods for Effective conceptual design, especially how we can understand and incite cognitive activities in designers to improve the concept generation process

Cross-disciplinary
- My work includes studies of engineering innovators or entrepreneurs, which is important as we develop models of teaching and student learning which are specific to engineering. Right now the tendency is borrowing ideas from disciplines such as business. Ideas that are more unique to engineering are often limited to earlier stages of innovation.
- I am interested in how entrepreneurial development connects with other areas of development more generally.
- Future Capacity Building that involves - pioneering leadership development - novel organizational development - capabilities for precautionary problem solving, conflict resolution and crisis prevention

Pedagogy/Models
- In connection with RQ1: Correlation/ synergies between research performance in engineering disciplines and educating engineers for entrepreneurship/ entrepreneurial thinking. 2. In connection with RQ3: How do the needs for entrepreneurship education for engineering students vary across different engineering fields- (one size fits all approach for all engineering fields is assumed inappropriate)
- Online learning and its use in the teaching of engineering, esp. w.r.t. project-based courses.
- Guidelines for developing extracurricular and co-curricular programs for exposing students to entrepreneurship and design thinking.
- Further working out and expanding how to embed entrepreneurship education in the engineering curriculum and enhance venture creation by engineering students.
- I think there is still a lack of understanding about entrepreneurial cognition. It seems that if we can understand better the underlying thought processes behind entrepreneurial behavior, we will have an easier time promoting entrepreneurship for engineering students.
- Is service learning related to student goals of entrepreneurship? Does observation of human struggles spark ideas for community entrepreneurship?

Other
- Appeal/inclusion of females and under-represented groups
- How can we encourage a greater diversity in the racial, gender and ethnic makeup of students who are interested in entrepreneurship-
- Questions of how to engage and support marginalized youth in entrepreneurship
- My primary interest is as an employer of future talent. Engineering studies and curricula must keep up with the workplace to assure success of business, especially US based manufacturing businesses.

How might the implications of Epicenter's research affect your work?

Response related to…	n = 47
Practice	**47% (22)**
Research – adding to body of knowledge	**30% (14)**
Research – Process/collaboration	**11% (5)**
Other	**13% (6)**

Practice
- It would provide a framework for how to engage students in entrepreneurship.
- Better prepare students for working on our grants.
- By influencing engineering schools, I would expect that future people entering the workforce will be more able to quickly adapt and contribute to the success of business and technical developments in the United States.
- Dissemination of methods that deliver measurable beneficial outcomes to all stakeholders.
- Findings from the work of Epicenter has the potential to impact the way we teach entrepreneurship to individuals in a variety of majors.
- Having a frame of reference for current practice, even if just in the US, would be very valuable, as would a template/benchmark for effective approaches. Coming from Epicenter/Stanford, such a template would be highly influential, internationally.
- How we will integrate collegiate education and learning with work in the field. Creation of early and mid term opportunities for innovative work.
- I believe the integrative thinking of entrepreneurial education is important underlying aspect of the areas of engineering education and design that are important to me. I am also interested in learning how to better develop entrepreneurial thinking within our service-learning design program. I believe our program does develop several underlying skills, but it would be beneficial to make an explicit connection.
- Integration of the results into existing engineering (education) curricula is a big interest for me.
- It might help us develop programs and initiatives at my university
- It will affect what I teach, if I learn some new approaches at the conference.
- It will most likely affect my work in the area of practical implementation on my campus - it will be excellent data for making decisions and understanding what has worked (or not worked) elsewhere.
- It would be helpful to have an understanding of the best practices in this field and what has and has not worked to be able to improve offerings at my institution.
- It's still early to say. The entrepreneurship programs on my campus are now well developed. I hope that the research results from Epicenter might help guide our development in the future.
- Provide better pedagogy for student engagement
- Results would help to inform methods we choose to implement in order to achieve the greatest possible impact.
- The implications could help us to improve our educational system and to create new and innovative courses within the university. The implications regarding the surroundings and experiences in RQ2 could also help to evaluate our concept for the new entrepreneurship center.
- The results of this work will inform better practices and ultimately how we deliver our curricular and experiential offerings

- We are actively incubating undergrad and grad student projects for commercial start up.
- We are always looking for ways to improve the scale up of student ventures and empowering students to realize their potential in economic development.
- We're interested in what you learn from your research and would hope to use some of that learning to modify our own pedagogical practices.
- If your research demonstrates that specific curricular changes will help develop students' entrepreneurial abilities, I would certainly be interested.

Research
- My cross-over is in interdisciplinary and collaborative research between art and engineering. I teach "how," but then my work just does it towards other ends. I have a vested in interest in facilitating arts research, and reciprocal understanding and work across art and engineering.
- Add to the knowledge base about how we teach and promote entrepreneurship.
- adding important insights into an aspect of engineering learning
- Could provide relevant insights for future research papers and research projects.
- Directly. The research from Epicenter will be valuable to gain a broader understanding of entrepreneurial learning occurs in an engineering context.
- Engineering education is an important aspect of entrepreneurial development, so understanding the impact of different types of entrepreneurial education for engineers is important for our research.
- Epicenter's research and my research are very closely tied.
- I think learning about entrepreneurship education for engineers has applicability beyond engineering. Students across disciplines are not as different as we think.
- I would be most interested in answers to RQ#3: "How can fundamental engineering curricula be reframed to stimulate integrative thinking, especially entrepreneurial thinking- I think implications of this work would be applicable to many in engineering education. Broader implications can be achieved if epicenter studies show positive impact on "outcomes" beyond entrepreneurship that are seen critical to engineering educators (e.g., starting salary, career satisfaction, academic achievement, etc.)
- It might affect the work in the sense that using different types of strategies (such as an open strategy) and experimenting with structural setups, yields different types of knowledge flows and knowledge creation.
- It will be helpful to have a better understanding of the research areas that still need to be explored in engineering entrepreneurship education.
- It would be helpful for me to know what kinds of workplaces and educational environments impact various types of entrepreneurial interests among various groups of students.
- My interests tend to focus on the underlying social-psychological models of entrepreneurship, and not a lot of what I have seen to date moves to that level
- Would like to see definitive, specific suggestions on ways to help ALL engineering students become more entrepreneurial in their thought processes.

Research – Processes / Collaboration
- Perhaps lead to collaborative efforts
- I hope that they may inform and improve our efforts and perhaps also serve as a mechanism for sharing of ideas and a nexus for collaboration.
- I think the community needs to develop a research agenda to accompany the development of courses and programs.
- I'm not sure. It is related to the dissemination of the work and its nature.

- Joint research for / international networking on / broadening understanding of Sustainable Innovation Strategies and Leadership Development, transfer into relevant curricula

Other
- Your definition of integrative thinking may overlap with entrepreneurial mindset-hard to tell for sure from your questions
- Depends on the outcome of the information and the metric by which any assumptions are made
- I would like to know more.
- Findings will be of interest
- Good to have a perspective outside of my local area
- I'm currently engaged with the Epicenter's research efforts.

How important might the implications of Epicenter's research work be to the field of entrepreneurship and engineering education research?
- 92% important + very important

How valuable might the implications of Epicenter's research work be to the field of entrepreneurship and engineering education research?
- 98% valuable + very valuable

To what extent has your research effected change in entrepreneurship and engineering education in the following areas?	% "a lot" + "a great deal"
advancing understanding at the national level	11%
advancing understanding at an individual or campus level	38%
affecting policy at the national level	4%
affecting policy at an individual or campus level	28%
affecting practice at the national level	13%
affecting practice at an individual or campus level	35%

For each of the following, please respond on a one to five scale: "To what degree..."	% "a lot" + "a great deal"
do you see yourself as broadly aware and knowledgeable of research in the field of entrepreneurship and engineering education?	44%
do you present yourself as a resource in supporting change (related to entrepreneurship and engineering education) on your campus?	59%
do faculty/admin on your campus see you as a resource for supporting change on your campus?	51%

What/who is the best example of using research as a catalyst for change at a university (specifically, in engineering) that comes to mind? Please be specific.
- Administrative support/ showing data impact on outcomes critical for administration. Recognition through teaching awards or through student accomplishments. broader public media
- A broad group of diverse experts (e.g. professors from different universities) coming together to create change.
- A study involving advanced entrepreneurship teams is proving our university insights into what resources teams need to start and grow a company while still enrolled as students.

- A University in North Carolina has been very successful at receiving our grants. At this point the projects that they've worked on under our funding have resulted in a broad understanding and applied level of sustainability principles. Results have included education labs, and local small businesses but all in all it's the campus wide buy-in in sustainability principles and entrepreneurship that I consider the larger success.
- Any of the new engineering programs: Smith College, Olin, James Madison
- Assessment of courses/programs using measures known to predict future intention
- Bob Dorf, teaching the lean launchpad concept. I don't agree with all of it, but it certainly should be included in how educators and researchers consider the next "big thing" in entrepreneurial education.
- Case studies of successful projects
- D-Lab at MIT has increased awareness of the ability of engineers and others to create change.
- Engineering education centers that help faculty teach well
- Epicenter's efforts and programs
- Faculty who start businesses with students
- Felder and Silverman
- Freeman Hrabowski at University of Maryland Baltimore County
- I am afraid I can't point to any specific item. I am certainly aware of research that shows that specific changes would help certain aspects of engineering education but that have not really had a major impact ...
- I am not sure that research is ever the key catalyst for change, but I think it has played a role in information the approaches taken in many cases, such as PUC (Chile), UCL (UK), UQ (Australia), HKUST (Hong Kong) and Lund (Sweden)
- Regarding engineering education: S. Sheppard (Stanford), L. Jamieson (Purdue), G. Gabriele (Villanova)
- International development projects often appear to be rather complex (e.g. integrated water-energy management, with respect to MDGs, UN Global Compact, requirements of LogFrame specification, ProjectCycle...). Research could create meta-modelling for better understanding of successful (!) sustainable innovation strategies
- Mary Besterfield-Sacre
- Michael Crow, President of Arizona State University used research he had done at Columbia and implemented that in practice at ASU.
- Online learning proponents appear to have the upper hand at the moment in instituting changes in teaching practices on many fronts.
- Probably the work of Henderson on the diffusion of different pedagogical techniques. As well as Felder, Prince and Brent with the NETI 1 and NETI 2 workshops. The Frontiers of Engineering Education program has also helped but has not been in existence long enough to know for sure.
- Prof. Manfred Hampe at TU Darmstadt in Germany analyzed why students drop out of their study program and created a program called KIVA, which increases the students' motivation, orientation and social skills. For example the students in this program have to participate in a two week interdisciplinary teamwork project at the very beginning of their undergrad program to get engaged in self-directed learning and teamwork. Furthermore Hampe engaged two psychologists instead of two technical assistants to take care of the students need and help them to find their interests.
- Recent educational experiments on campus with flipped classrooms have been a catalysts for other engineering faculty to flip.
- Resource for changes in eship and innovation. lead for NCIIA pathways team

- The development of living learning communities for a number of students; the development of entrepreneurship Masters program
- Warren Seering's study of what MIT engineering students actually use and remember 5+ years after graduation. That was a great study.

To what extent do you work on translation of research into practice?
- 52% "a lot" + "a great deal"

With respect to your scholarship, to what extend to you feel that you are working…	% "a lot" + "a great deal"
on your own	30%
with a team on campus	53%
with a cross-campus team	40%
on a nationally-oriented research project	33%
on a internationally-oriented research project	17%

In your opinion, how strong is the community of researchers in entrepreneurship and engineering education?
- 25% "strong" + "very strong"

What role can Epicenter play in fostering community among researchers in this field?
Physical gatherings
- Bring people together, physically
- Organizing events that bring the researchers together to their research, get feedback, and foster new collaborations.
- More in-person workshops and collaborations. Workshops at various campuses that involve other faculty, and students!
- I think that providing opportunities for the group of individuals working in this field to meet and discuss issues related to entrepreneurship education is very beneficial. Although face-to-face meetings are important I also think that some form of virtual meetings through Adobe Connect might work. I currently participate in a Virtual Community of Practice in Chemical Engineering and have found this form of meeting very helpful.

Sharing, virtual and physical
- Can help draw together expertise outside of engineering with those in engineering interested in this subject.
- Create a network
- By providing opportunities for researchers and campus communities to network and engage in dialog and collaborative research opportunities
- common internationally-oriented research projects, internships between educators,
- Bring together the key players around a program that addresses common issues and challenges in a systematic manner
- Organize and get universities talking to each other
- (1) set up webinars featuring successful activities (featuring well-known educators in the field) and research (featuring good quality research). (2) organize an edited multi-author book that features chapters on classroom activities. (3) a JEE special issue"
- Offer more opportunities for researchers that are not from the traditional "top" e-ship schools to be active in the Epicenter research.

Dissemination
- Being a hub for research that is being done, helping to connect people with similar interests, providing funding opportunities, connecting research with practice.
- Greater dissemination of perspectives and practices to all types of institutions.
- It can play an enormous role, both within and outside the US. The brand carries a lot of weight – it is seen, internationally, as the key group working in the field – and is one that would catalyze an international community of scholars and practitioners.
- I see your role as a place to both in person and virtually bounce ideas off of others. Be a location to share experiential education. A place to share both curricula and success stories. A discussion board. A content marketplace. A networking site. A success outlet.
- By broadening the knowledge platform, extending it to researchers from various parts of the world.
- Raise awareness, provide curricular pathways for integration of Epicenter research results

Leading the way
- Conducting fundamental research, developing and disseminating practices based on that research.
- Giving us graphical results that are easy to cite and present at faculty meetings.
- Take the lead.
- Leadership in future entrepreneurial education, creating strong international partnerships, integration of diversity of research in this field, transformation into future-related capacity building
- Central role - increasing visibility would be great

Other
- involve them more in NCIIA activities
- Include everyone who teaches it, regardless of having a Ph.D.
- I have been unable to judge the extent to which the Epicenter is fostering community compared to other efforts (for instance ASEE).
- Not sure beyond what Epicenter is already doing - the upcoming meeting in August sounds like a great start.
- Keep forming relationships that will hopefully last beyond the Epicenter funding.
- Propose research concepts and provide mentoring and packets of background material that can help smaller, less experienced engineering education and entrepreneurship teams to be able to compete for funding.
- Does a lot by bringing people together in various ways.
- convener
- More of the same of what's it's doing
- We need lots more little. I think that there is so much low-hanging fruit that just needs consistent (small) attention to be taken advantage of.
- Epicenter is doing a great job at this already.

How might a community of researchers engage with a community of practitioners?
Meeting and sharing
- The question shows the problem. We need to address the chasm between researchers and practitioners. (Actually, what do you mean by practitioner- Teaching faculty- Ugh.) Why can't researchers get in the classroom more, and why can't teaching faculty be educated on research basics.

- There is no substitute for building a community of like-minded practitioners, and developing a culture of learning that esteems best practice. That gives researchers a voice.
- Field observations at entrepreneurial workplaces. Sabbaticals at innovative workplaces. Campus residence by innovators
- By living our life during classes and observing different faculty... for long periods of time.
- Via common engagement practices, guest lectures, competitions etc..
- Make workshops where practitioners can work on specific course implementations while researchers consult and introduce latest findings.
- summit such as the one we are holding in August
- Joint conferences / think tanks - Specified in-house seminars - Joint multi-dimensional development projects (such as urban-industrial co-development)"
- ASEE - booth, workshops, talks
- Offering workshops and training
- Provide guidelines and frameworks for organizing interventions to engage students in entrepreneurship.
- I think that sharing best practices is the best starting point. Once relationships are built the translation should naturally occur.
- Learn from each other
- I think what I listed above can help engage both communities: set up webinars featuring successful activities (featuring well-known educators in the field) and research (featuring good quality research). organize an edited multi-author book that features chapters on classroom activities
- Through an ongoing dialogue (forums, email lists, etc), as well as conferences and collaborative projects.
- Focused workshops/events

Collaborating on research/practice
- Do research funded by practitioners so it meets real needs not academic publication goals
- Research projects which explicitly link the two groups would be very useful - for example, research funding which carries two components, one research-based and one which implements and evaluates the ideas.
- By bridging the gap between academia and praxis through working together.
- Through collaborative projects, student pipelines to industry, as consultants.
- The School of Sustainability at Arizona State is a good example. A small department with large reach by establishing Senior Sustainability Scientist titles for those interested in collaborating and proving help and space to get things going.
- I don't know that the two are necessarily separate, but if that's the assumption I think that coming together around real world context integration into academic research and education is key.
- Work with schools/programs that have programs in place to implement new research into experimental curricula.
- Through individual partnerships and collaborations.
- I don't think the "community of entrepreneurs" will have much time or interest in engaging with the community of researchers. They are much too busy being entrepreneurs!
- Facilitated collaboration.
- Put research into practice through experiential education opportunities on campuses that are developing entrepreneurship pathways.

- Often the two talk past one another. They often say they have the same goals but in reality they do not – researchers want to "prove" things (hypothesis driven work) and are "done" when they get their publication. Practitioners just want to try things and often learn through their own trial an error what works and what doesn't (instead of looking to the literature). These are over-generalizations, but it means that the two often speak different languages and good research does not get disseminated and turned into good practice
- Develop a web-based listing of potential collaborators and mentors. It has to be a one-to-one match – not open dialog – because of potential confidentiality issues

Which conferences, journals, associations, etc. are important to you? List all that apply
- ASEE (15)
  - ASEE ENT
- JEE (15)
- NCIIA (13)
- IJEE (5)
- FIE (4)
- JEEN (4)
- AEE (4)
- Epicenter (3)
- IEEE (3)
- Academy of Management (2)
- AEE (2)
- AERA (2)
- AIChE (2)
- Journal of Engineering Entrepreneurship (2)
- Open Conference (2)
- Administrative Science Quarterly
- AECT
- American Society for Engineering Education
- American Society for Quality
- American Sociological Association
- American Sociological Review
- AoM
- Art Journal
- Ashoka
- ASME IDETC
- ASTD
- CHI
- Clinton Global Initiative U
- Critical Inquiry
- Design Society
- Design Studies
- Educational Technology Research and Development
- Engineering Entrepreneurship
- Engineering for Change website and publications including case studies (Demand)
- Entrepreneurship Theory & Practice

- GCEC
- Global Humanitarian Technology Conference (IEEE)
- HBR
- ICA
- ICED
- ICLS
- ICSB
- IDETC
- Innovative Higher Education
- Institute of Industrial Engineers
- ISBE
- ISDRS
- ISEE
- JMD
- Journal of British Management
- Journal of Business Research
- Journal of Business Venturing
- Journal of Higher Education
- Journal of Learning Sciences
- Journal of Mechanical Design
- Journal of STEM Education
- JPIM
- KEEN
- Leonardo
- Long Range Planning
- Management Science
- MISQ
- NCA
- Organization Science
- PDMA
- Population Association of America
- RED
- REEN is probably the conference of most interest
- Research in Higher Education
- SASE
- Springer
- STEAM Journal
- Strategic Management Journal
- USASBE
- UWF
- WASD
- World Domination Summit

What one article/paper/book would you recommend to a student with a budding interest in entrepreneurship and engineering education?

- *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, Osterwalder, A. and Pigneur, Y. (2010), Wiley. (2)
- *The Art of the Start* – Kawasaki (2)
- *Blue Ocean Strategy*
- *Creating Innovators*
- *Deconstructing the Innovator's DNA.* Mathis,D., Fila, N., & Purzer, S. (2014). Proceedings of ASEE Annual Conference and Exposition. Indianapolis, IN.
- *Ecological Economics – A Framework for Creating Social and Ecological Intelligence*. O'Hara / Schwendner
- *Effectuation* by Saras Sarasvathy
- *Entrepreneurship: Its Role in Engineering Education*
- *Impossible, Worthless, and Stupid*
- *Innovator's DNA: Mastering the five skills of disruptive innovators*.Dye, J., Gergerson, H., & Christensen, C. 2011. Harvard Business Review.
- *Innovators DNA*
- *Little Bets*
- Sheri Sheppard's work
- *Technology Ventures: From Idea to Enterprise* by Tom Byers
- *Thanks for the Feedback* by Stone and Heen
- *The Coming Jobs War*
- *The Innovator's Dilemma*
- *The Nature of Technology* by Brian Arthur
- *Toy and Game Inventors' Handbook*, (even though it is out of print). This book goes through all of the stages of getting a product into the market. It is quite enlightening in terms of what we aren't teaching students that want to start a business that involves making a tangible product. It also talks about the risk involved in working for yourself.
- *Will It Fly?*
- Varies wildly across different domains. Probably end up with a collection organized around different purposes
- While I have learned a lot from some papers/books on education in general, I can't think of any particular one that I would strongly recommend to such a student.

What researcher would you direct that student to talk to?
- Sheri Sheppard (8)
- Mary Besterfield-Sacre (2)
- Tom Byers (2)
- Nathalie Duval-Couetil (2)
- Leticia Britos Cavagnaro
- the STVP team
- Angela Duckworth
- Brian Thompson
- Clay Christensen
- J. Gowdy
- Jim Oliver
- Skysong at ASU
- on our campus: no one

- I doubt I would send them to a researcher! I would send them to a living breathing entrepreneur, probably an alum of my university