TE 250: Week 2 Fall 2021
Vision, Creativity & Innovation

John Thode
jthode@illinois.edu
Topics

- Paul Couston
- Who Are You?
- Top 10 Idea Pitches & Next Steps
- What is Creativity?
- More Innovation
- UIUC Inventors & Innovators
- TEC & the UIUC Innovation Ecosystem
Who Are You?

Name, Major, Fun fact
Top 10 Idea Pitches (Any last-minute appeals?)

2 minutes - No slides

Idea/Company - Be sure to answer:
What problem are you solving?
How are you solving it?
What do you need?

Team/Culture – Be sure to answer:
What do you need – people, skills, other resources?
How do you like to work?
What team culture do you want to cultivate?
What values do you find non-negotiable?
Exercise

• Break up into small groups.
• Discuss the following question:
  • Are you concerned someone will steal your idea/problem if you share it?
  • Why or why not?
What is **Creativity**? And what role does it play?

Imagination is the result of wanting more.

Vision is the ability to see the world the way you want it to be.

Creativity is the ability to use the imagination to develop new ideas, new things, or new solutions.

Imagination → Vision → Creativity → Invention → Innovation
Resources for a Creative Enterprise

• Knowledge in the Required Domain and Fields — knowing what is new
• Intellectual Abilities to recognize connections, redefine problems and envision and analyze possible practical ideas and solutions
• Inventive Thinking about the problem
• Motivation towards Action
• Opportunity Oriented Personality and Openness to Change
• Contextual Understanding that supports creativity and mitigates risks
Creativity Process

Start

Describe the **Problem**

Reframe and Start Again

- Build a Prototype and Show It to the Customer
- Evaluate and Test the Ideas
- Insights, Ideas, Inventive Thinking

Incubation Period: Observe and Study the Problem

Intuitive Thinking, Brainstorming
Systematic Creativity

Of 200 top-rated ads, 89% fit 1 of 6 templates
Of losing ads, only 2% fit a template
➢ highly creative ads are *more* predictable than uncreative ones
So can Creativity be taught?

3 groups of study participants, each wrote an advertisement:

• No training = annoying
• Free association = less annoying, no more creative
• Taught 6 templates = 50% more creative
Group Creativity Exercise

- Brainstorming Diamond
- Reverse Planning
- Disney Creative: Dreamer/Realist/Critic
- Walking Meeting
- Psychological Distancing / Superhero
- SCAMPER
Invention vs. Innovation
Invention is...

• The creation of something new
Innovation is...

- Utility or exploitation of an existing idea
- Improvement of an existing idea
- Application of an existing idea in new way
- Combination of existing ideas
- Addition of economic value:
  - Product
  - Process
  - Service
  - Ways of Doing Business
THREE CAPABILITIES OF INNOVATION

CREATIVE ABRASION
The ability to generate ideas through discourse and debate

CREATIVE RESOLUTION
The ability to make integrative decisions that combine disparate or even opposing ideas

CREATIVE AGILITY
The ability to test and experiment through quick pursuit, reflection, and adjustment

SOURCE LINDA HILL, GREG BRANDEAU, EMILY TRUELOVE, AND KENT LINEBACK

HBR.ORG
Types of Innovation

<table>
<thead>
<tr>
<th>Linkages between modules</th>
<th>Reinforced</th>
<th>Overturned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchanged</td>
<td>Incremental innovation (&quot;faster, better, cheaper&quot;)</td>
<td>Component or modular innovation</td>
</tr>
<tr>
<td>Changed</td>
<td>Architectural innovation</td>
<td>Radical or disruptive innovation (&quot;brave new world&quot;)</td>
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Examples of Innovation Types:
Established product: room fan

Incremental: Insulate to dampen noise, blade design

Modular: Dyson bladeless fan

Architectural: Portable fans - same components, different construction

Radical Innovation: Central A/C
Disruptive Innovation

Disruptive (radical) innovations introduce a set of attributes to a marketplace different than the ones that mainstream customers historically have valued, and the products often initially perform unfavorably along one or two dimensions of performance that are particularly important to those customers.

The Expected Trajectory of a Disruptive Innovation

- **Current performance of the innovation**

- **Expected Trajectory**

- **Time**

- **Performance**

- **Range of performance required in the mainstream market**
### Industry Types – Examples?

<table>
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<tr>
<th>CHARACTERISTICS</th>
<th>TYPE OF INDUSTRY</th>
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<tbody>
<tr>
<td></td>
<td>Mature</td>
</tr>
<tr>
<td>Revenue Growth</td>
<td>Slow</td>
</tr>
<tr>
<td>Stability</td>
<td>High</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Low</td>
</tr>
<tr>
<td>Industry Rules</td>
<td>Fixed</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>High</td>
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Emergent Industries

Newly created or newly recreated industries formed by product, customer, or context changes [Barney 2002].
## First Mover (Dis)Advantages

<table>
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<tr>
<th>Possible Advantages</th>
<th>Possible Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>• Create the Standard and the Rules</td>
<td>• Short-Lived Advantages Are Competed Away</td>
</tr>
<tr>
<td>• Low Cost Position</td>
<td>• Higher Development Costs</td>
</tr>
<tr>
<td>• Create and Protect Intellectual Property</td>
<td>• Established Firms Circumvent or violate patents and intellectual property</td>
</tr>
<tr>
<td>• Tie Up Strategic Resources</td>
<td>• Cost of Attaining the Resources</td>
</tr>
<tr>
<td>• Increase Switching Costs for the Producer</td>
<td>• High Uncertainty of Designing the Right Product. If vision is wrong, then large costs to switch</td>
</tr>
<tr>
<td>• Increase Switching Costs for the Customer</td>
<td>• Customer is reluctant to buy when a large cost to switch may be incurred</td>
</tr>
</tbody>
</table>
Exercise

• Break up into small groups.
• Discuss the following question:
  • What is the value of intellectual property to a startup (patents, trademarks, trade secrets, copyrights, etc.)? Should it be a primary focus?
  • Why or why not?
Innovation at Illinois:
Inventor or Innovator?

JOHN BARDEEN
Honorary Degree, 1974

Co-inventor of the transistor which revolutionized the electronics industry. Co-creator of the fundamental theory of superconductivity, known as the BCS theory.
Innovation at Illinois: Inventor or Innovator?

**Nick Holonyak Jr.**

BS, Electrical Engineering, 1950

MS, Electrical Engineering, 1951

PHD, Electrical Engineering, 1954

Inventor of the light-emitting diode (LED) and a contributor to the first practical quantum well laser, which enabled modern fiber optics communication.
Innovation at Illinois: Inventor or Innovator?

Donald L. Bitzer

BS, Electrical Engineering, 1955
MS, Electrical Engineering, 1956
PHD, Electrical Engineering, 1960

Inventor of the plasma display monitor, forerunner of the modern flat panel television screen, and co-developer of PLATO, the first computer-based interactive educational network and home of the first online community.
Innovation at Illinois: Inventor or Innovator?

THOMAS M. SIEBEL

AB, History, 1975
MBA, 1983
MS, Computer Science, 1985
Honorary Degree, 2006

Technology entrepreneur, founder, chairman, and Chief Executive Officer of Siebel Systems, a global leader in application software and recognized as one of the world’s preeminent software companies.
Innovation at Illinois: Inventor or Innovator?

MARC L. ANDREESSEN

BS, Computer Science, 1994

Co-author of Mosaic, the first widely used web browser that transformed the exchange of information. Co-founder of Netscape Communications Corporation, which produced the Netscape Navigator web browser.
Innovation at Illinois:
Inventor or Innovator?

Max Levchin
1997 BS
Computer Science ILLINOIS

Technology Entrepreneur, angel investor, and cryptographer; Cofounder of PayPal, creator of online security and fraud-prevention systems; Founder and CEO of Slide; Founder and CEO of Hard Valuable Fun (HVF) incubator lab.
Exercise

• Break up into small groups.

• Discuss the following question:
  • What do you think are the most attractive attributes of being a successful entrepreneur? What are the attributes you find most attractive personally?
  • Why or why not?
**SocialFuse**
Pitch your idea, find teammates, and network!
**WED., SEPT. 15 | 4-6pm**
RSVP | go.illinois.edu/socialfuse

**Startup City Scholars Kickoff Event**
Pitch for cash prizes, work on finding teammates for the Grainger Engineering Startup City Scholars Spring 2022 semester in Chicago, or just attend to learn more.
**AUG. 31 | 5-6:30pm | VIRTUAL EVENT**
RSVP | go.illinois.edu/scs

**Innovation Expo**
A resource fair for entrepreneurs, designers, and innovators!
**WED., SEPT. 1 | 11am-1pm**
ISR MAIN LEVEL
RSVP | go.illinois.edu/innovationexpo
Innovation & Entrepreneurship Ecosystem

**INTERNAL PARTNERS**
- Research Park
- Gies Business
- Housing
- Illinois Ventures
- Siebel Center for Design
- Office of Technology Management
- NCSA National Center for Supercomputing Applications
- RSOs FOUNDERS CUBE CONSULTING ZEROZONE

**EXTERNAL PARTNERS**
- Chicago
  - GRAINGER ENGINEERING City Scholars & Startup City Scholars
  - DPI
  - Discovery Partners Institute
  - UChicago POLSKY
  - THINK CHICAGO
- CHICAGO QUANTUM EXCHANGE
- CHICAGO QUANTUM ACCELERATOR
- uChicago POLSKY
- KEEN
- Kern Entrepreneurial Network
- National & Midwest i-CORPS Programs
- National & Regional Networks

**TECHNOLOGY ENTREPRENEUR CENTER**
- Grainger Engineering
  - ILEE DEGREE
  - COURSES & CERTIFICATES
  - INNOVATION LIVING-LEARNING COMMUNITY
  - SILICON VALLEY ENTREPRENEURSHIP WORKSHOP
  - ILLINOIS I-CORPS
  - COZAD NEW VENTURE CHALLENGE
  - ILLINOIS INNOVATION PRIZE

*OFFICE OF THE ASSOCIATE DEAN FOR INNOVATION & ENTREPRENEURSHIP*

*This is not an exhaustive list of the entire ecosystem, but a general overview.*
Grainger Engineering | Entrepreneurship Education Pathway for Students

**EXPLORE & IDEATE**
A great place to start! Take a peek under the hood of innovation & learn what an entrepreneurship mindset might mean for you.

**COURSES**
- TE 100 | Introduction to Innovation, Leadership, & Engineering Entrepreneurship
- TE 200 | Introduction to Innovation
- TE 230 | Design Thinking/Need Finding
- SE 361 | Emotional Intelligence Skills
- TE 398 | Innovation & Engineering Design
- TE 401 | Introduction to Design Thinking

**UNDERGRAD CERTIFICATES**
- Innovation
- Technology Commercialization

**BS DUAL DEGREE**
- Innovation, Leadership, & Engineering Entrepreneurship (ILEE)

**PROGRAMS & EVENTS**
- Chicago Entrepreneurship Workshop
- Entrepreneurship Advising
- Grainger Engineering City Scholars
- Grainger Engineering Startup City Scholars
- Innovation Living-Learning Community (LLC)
- TEC Student Advisory Board
- ThinkChicago
- Silicon Valley Entrepreneurship Workshop
- SocialFuse
- HackIllinois

**EXPLORE & IDEATE**
Ideas are developed here! Determine needs in the market & develop solutions that address real-world problems.

**COURSES**
- TE 230 | Design Thinking/Need Finding
- TE 250 | High Tech Ventures: From Idea to Enterprise
- TE 333/TE 598 | Creativity, Innovation, Vision
- TE 360/460 | Lectures in Engineering Entrepreneurship
- TE 398 | Innovation & Engineering Design
- TE 398 | Urban Entrepreneurship
- TE 401 | Augmented Listening Technology
- TE 401 | Design Thinking for Social Impact
- TE 401 | Design Thinking for Women’s Health
- TE 498 | UX Fundamentals

**UNDERGRAD CERTIFICATES**
- Innovation
- Technology Commercialization

**BS DUAL DEGREE**
- Innovation, Leadership, & Engineering Entrepreneurship (ILEE)

**PROGRAMS & EVENTS**
- Entrepreneurship Advising
- International Student Workshop
- Silicon Valley Entrepreneurship Workshop
- SocialFuse
- HackIllinois

**DESIGN & EVALUATE**
Startups take shape here! Dig deeper into the commercialization stage and make sure your startup is best prepared to hit the market.

**COURSES**
- TE 250 | High Tech Ventures: From Idea to Enterprise
- TE 298 | Communication for Tech Innovators
- TE 360/460 | Lectures in Engineering Entrepreneurship
- TE 398 | Successful Storytelling: Designing the Ultimate Pitch
- TE 401 | Developing Breakthrough Projects (Independent Study)
- TE 450 | Startups; Incorporation, Funding, Contracts, & Intellectual Property
- TE 461 | Technology Entrepreneurship
- TE 466 | High Tech Venture Marketing
- TE 498 | Alchemy Technology Foundry
- TE 498 | Hacking for Defense
- TE 565 | Technology, Innovation, & Strategy

**UNDERGRAD CERTIFICATES**
- Innovation
- Technology Commercialization

**BS DUAL DEGREE**
- Innovation, Leadership, & Engineering Entrepreneurship (ILEE)

**PROGRAMS & EVENTS**
- Cozad New Venture Challenge
- Intellectual Property Clinic
- Mottier Innovation Challenge
- 54 Startup Weekend

**BUILD & LAUNCH**
Ventures level up here! Become the hero of your market as you position your venture to quickly reach more customers successfully.

**COURSES**
- SE 361 | Emotional Intelligence Skills
- TE 398 | Bootstraps to Venture Capital: Funding Your Startup
- TE 450 | Startups: Incorporation, Funding, Contracts, & Intellectual Property
- TE 466 | High Tech Venture Marketing
- TE 498 | Leading Sustainable Change
- TE 498 | Alchemy Technology Foundry
- TE 566 | Finance for Engineering Management
- TE 567 | Venture Funded Startups
- TE 565 | Technology, Innovation, & Strategy

**GRAD CERTIFICATES**
- Business Management for Engineers
- Strategic Technology Management

**PROGRAMS & EVENTS**
- Illinois I-Corps
- Illinois Innovation Prize

Technology Entrepreneur Center Degree, Courses, Certificates, & Programs (unless otherwise noted)
Gies College of Business
- Disruption Lab
- Origin Ventures Academy for Entrepreneurial Leadership
  - iVenture Accelerator
  - Illinois Social Innovation
  - EntreCORPS
  - Entrepreneurs Without Borders
- Hoefl Technology & Management Program
- Illinois Maker Lab

Research Park
- EnterpriseWorks
- Entrepreneur-in-Residence Program
- AgTech Innovation Summit
- Big Data Summit
- CEO Roundtable
- SBIR & STTR Technical Assistance Program
- I-Start Accelerator Program

Illinois Ventures
- Consulting Services & Funding
- Proof of Concept Grants

Siebel Center for Design
- New Courses based in Design Thinking (DT) & Human Centered Design (HCD)
- Integrating DT & HCD into Existing Courses
- Fostering Multidisciplinary Collaborations
- Innovative Building Space Opening Soon
- DT & HCD Training
- Illinois RapidVent Partner

Office of Technology Management
- Disclosure & Licensing Info
- Illinois Ignite & Share the Vision Events
- Illinois Proof of Concept (I-POC) Program

RSOs
- Founders: Illinois Entrepreneurs
- Zero2One
- CUBE Consulting
- OTCR Consulting
Exercise

• Break up into small groups.
• Each student name an entrepreneur and/or startup you admire and why.
• ID at least 5 common characteristics among those selected by the group members