EAS 590

Building an Engineering Sciences Startup

Instructor:	Tomas Isakowitz (tomas@upenn.edu)
Class meetings:	Mondays and Wednesdays 5:30 to 7pm,
Lessons Learned:	Monday May 2 nd 5:30pm
Location:	Towne Hall 305 UPENN, Philadelphia, PA 19104

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Course Philosophy

It turns out that startups are not simply smaller versions of large companies. Therefore we need *different* processes for building and growing them.

We define a startup as a **temporary organization designed to search for a repeatable and scalable business model**. The emphasis on the **search** for a business model versus **execution** of a plan is the heart of the Lean Startup methodology.

Startup Vision

To avoid confusion between a real company, a project, an idea for a startup, etc. we will name it a *startup vision*. The goal of the class is to provide you with tools to determine if this vision is a mirage or it can become a reality. You will get to decide what startup vision to work on.

Real or not?

Students can work on a real or simulated startup vision. The difference is that with the former there is intent to continue with the project once class is over. A simulated project requires nonetheless the same amount of work and commitment during the span of the class.

Sharing of Ideas Materials:

Everything that is discussed and presented in class is open to the general public and will be publicly distributed. This includes presentations and videos made by students. EAS 590 instructors, students, and guests may freely discuss and distribute EAS 590 related materials and ideas presented in class. If there are elements that you wish to remain confidential, do not share them in class.

<u>Teams</u>

Startups are team-based efforts in real life. We will work in teams during the class. These will be formed during week 7.

Intellectual Property Ownership

Any intellectual property (patents, copyright, and software) and other materials developed by teams will be jointly owned by all team members. This means that every team member has separate individual; ownership rights to ALL the materials developed by the student's team.

Interviewing

Most of the work you will be doing outside of class time will be devoted to *going out of the building* and finding out if your guesses about your startup vision match reality. You will do this by interviewing potential customers, partners, and other key stakeholders.

This type of work is probably very different form what student are used to. You will not be doing lots of readings or solving scientific problems. You will learn how to interview people via in-class instruction but mainly through trial and error. It will be a lot of work, some of it will feel tedious and repetitive. It is however, a core tenet of the startup philosophy we are teaching and it is **irreplaceable**.

<u>Improv</u>

We want to create an environment fertile fro the development and testing of ideas. This requires keeping an open mind, working in groups, observing your environment, listening, solving problems, accepting failure and being uninhibited about presenting ideas. We have developed a series of workshops based on improve techniques whose goal is to facilitate all of the above.

Expected work commitment

The amount of work outside of the classroom is estimated to be about 6 hours per week.

Each student is expected to conduct an average of 2 interviews per week. On average, each interview takes 2 to 2 ½ hours of work, broken out as follows: ½ hr. to set up, ½ to conduct, ½ to coordinate (travel), and ½ to debrief.

In addition to the interviews, required readings and videos are estimated to take about 1 ½ hours per week.

It is important that you follow the preparation requirements for each class, including watching videos as it will be assumed you have watched these and the concepts introduced there will not be re-introduced during class.

Course structure:

The course is divided into two parts.

- Part 1: Ideation and Team Formation. In the first five weeks of the course we focus on developing the students' creative potential and fostering a culture of collaboration and support with the dual goal of finding appropriate projects to work on during the remainder of the class and fostering the creation of teams. This is achieved through a series of hands-on experiential activities designed to develop creative potentials and getting to know your classmates. In addition, key elements of Customer Discovery are introduced. Teams are formed on week 6.
- **Part 2: Project Development.** The remainder of the course focuses on an iterative process of formulating and testing hypotheses about the startup vision and revising it accordingly. During this part of the course, most sessions will be structured as follows:

Mondays: about 1/2 of class time will be devoted to a lecture and class discussion on the topic of the week. The remainder will be for teams to work in-class on their findings and on preparing their Thursday presentation.

Wednesdays: teams will present their findings to the class and will receive feedback. Additional instruction may take place as needed.

Texts, Online Videos, and Tools

The readings and online lectures are:

- Optional:
 - <u>The Startup Owners Manual</u>: The Step-by-Step Guide for Building a Great Company (Steve Blank and Bob Dorf, 2012)
 - <u>Business Model Generation</u>: A Handbook for Visionaries, Game Changers and Challengers (Alexander Osterwalder, Yves Pigneur, 2010)
- <u>Required:</u>
 - o Steve Blank's Udacity lectures: "How to Build a Startup" videos (these are free)
 - o handouts and articles distributed during class sessions

Business Model Canvas:

You will learn about the Business Model Canvas in the videos and class sessions. It is fundamental tools for succinctly representing the elements of a business model that are most relevant to a startup.

You will learn to use the BMC to represent the business model for your startup vision, and it will be present in all your presentations. We will focus on the two boxes of the upper right hand side. Value Propositions and Customer Segments are the only boxes you need to provide in your presentations unless explicitly asked to do otherwise.



Team Presentations

Teams will be required to present almost every week starting in week 7.

Part of what the program training is on giving presentations and pitches. The more you practice the better you become. So, take each presentation seriously and use it as a means to improve your skills.

Instructors

Tomás Isakowitz - Program Director, PCI Fellows, Penn Center for Innovation, and Adjunct Faculty in PSoM, University of Pennsylvania

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Dr. Isakowitz established and directs the PCI Fellows Program at the Penn Center for Innovation (PCI) at the University of Pennsylvania's. The PCI Fellows Program is a hands-on experiential learning program for Penn graduate and post-doctoral students. Fellows are trained in intellectual property protection and early technology commercialization by actively participating in PCI's day-to-day activities.

Dr. Isakowitz is on the faculty of Penn's Perelman School of Medicine and Penn's School of Engineering and Applied Sciences, where he develops and teaches graduate courses related to the commercialization of technologies and entrepreneurship.

Prior to PCI, Dr. Isakowitz occupied senior positions in Equity Research at a number of Wall Street firms.. Before that, Isakowitz was Assistant Professor of Information Technology at NYU's Stern School of Business.

Dr. Isakowitz earned a Ph.D. in computer Science from the University of Pennsylvania, a Master of Science in Mathematics from the University of California at Santa Barbara, and a Bachelor in Science degree in Mathematics from the Hebrew University of Jerusalem.

Guest Instructor (improv) Michael McFarland

Michael McFarland is an improvisor and instructor now residing in the Philadelphia area. He currently teaches at the Philly Improv Theater. Michael has performed in resident ensembles and countless shows at the Magnet Theater (NYC), The People's Improv Theater (NYC) and most recently Washington Improv Theater(DC). Michael has taught workshops at numerous festivals and theaters around the country, GW University and The University of Iowa. He performs locally with the duo Michael Loves Greg and The La Fontaines.





Grading

Success in EAS 590 is not dependent on having a successful startup. Given that most startups fail, it would be unreasonable to expect that everyone in the class will end with a validated startup vision. Since the class is about learning a methodology for startups, success is measured in terms of the quality and quantity of work done and getting out of the building.

All homework's should be submitted via canvas and are due by midnight of the day preceding the date indicated in the syllabus.

Individual	Points
home work submissions	10%
quizzes	10%
interviews	10%
Class Participation and Attendance	20%
Total	50

Your grade is composed of individual and team components as follows:

Team	Points
Weekly Presentations	40
Lessons Learned Presentation and video	10
Total	50

Individual Grades

Homework submissions: described in schedule.

Quizzes: on some classes there will be quizzes based on the Udacity video lectures assigned. You will have to complete these quizzes at the start of class.

Interviews: you are expected to keep an interview log with photos, and other information as detailed below.

Quality of customer interviews: interviews need to provide insights, details about the interview, and proper thumbs up, down, or neutral for the various hypotheses tested in the interview. The only customer interviews that count are the ones that have been logged in the journal by the same deadline as the presentation's.

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Attendance: Students are expected to attend and participate in all classes. If for any reason a student will not be in class, they should contact course director prior to class to alert them of the absence and make arrangements to make up course content. Two excused absences (will not affect course grade but are required to be made up on the students own time) are allowed during the course. More than two absences will result on a nil participation grade.

Team Grades

Team Presentations: if the number of interviews logged for a certain week is less than 2* (# team members), your team will not be allowed to present and will receive a grade of zero for that presentation. The format for each presentation, including specific slides, will be discussed in class.

Lessons Learned Presentation and video: is during final's week. Here your team will discuss your startup vision, what you discovered using the customer development process and what your lessons learned are. You will produce a 2 minute video of lessons learned.

Academic Policies

Student Disabilities Services

The University of Pennsylvania, provides reasonable accommodations to students with disabilities who have self-identified and been approved by the office of Student Disabilities Services (SDS). Please make an appointment to meet with me as soon as possible in order to discuss your accommodations and your needs. If you have not yet contacted SDS, and would like to request accommodations or have questions, you can make an appointment by calling SDS 215.573.9235. The office is located in the Weingarten Learning Resources Center at Stouffer Commons 3702 Spruce Street, Suite 300. All services are confidential.

Schedule

Week	Monday	Wednesday	Assignment
1a 1b	1/18 NO CLASS MLK	 1/13 Introduction to Building a Startup Problem Identification Improv session #1: Team building, awareness, listening 1/20 Finding and interviewing Stakeholders Improv session #2: asking the right questions, Listening, Synthesizing 	 #1 Problem identification Read HBR paper Watch SB Udacity lectures 0,1, 1.5A and 1.5B (due 1/20) #2 View BMC video (due 1/25)
2	 1/25 Joint Problem Selection What is the Business Model Canvas and how to use it 	 1/27 Constructing and using Interview scripts Introduction to SIT problem Solving Techniques 	 #3 Business Modeling and Experiments Watch SB Udacity lecture 2 - Value Propositions (due 2/1)
3	 2/1 How to formulate Value Propositions Analyzing Interview results Hypotheses and experiments 	 2/3 SIT problem Solving Techniques #2 Improv session #3: listening skills, building in ideas by others. Problem solving as a team 	 #4 Problem Background and Solution Approaches Watch SB Udacity lecture 3 - Customer Segments (due 2/8)
4	 2/8 Identify Customers Segments Hypotheses and experiments 	 2/10 Analyzing Customer Archetypes Customer Workflow 	 #5 Customer Interviews Watch Value Proposition Canvas video (due 2/15)

5	2/15	2/17	#6
	L: Identifying Pains, Gains,	L: Minimal Value	Problem Identification for project
	Jobs: the Value	Proposition analysis and	selection
	Proposition Canvas	construction	(Due 2/22)
6	2/22	2/24	#7a
	A: Team Formation and	L: Market Sizing and	Initial Team Interviews (due 2/29)
	Problem Definition	A: Opportunity	
		Assessment	#7h Opportunity Assessment
		, 50000110110	Presentations (Group)
			(due 3/2)
7	2/29	3/2	#8 Watch SB Lidacity lecture 8 -
/	A: Developing	D: Teams present	Resources Activities and Costs
	A. Developing	P. Teams present	(duo 2/14)
	Brosontation	Opportunity Assessment	(due 3/14)
	2/7	2/0	
	SPRING BREAK	5 5	
8	3/14	3/16	#9a Watch SB Udacity lecture 4 –
	L: Resources Activities and	P: Product Market Fit	Channels (due /21)
	Costs		
			#9b Resources Activities and Costs
			presentation (due 3/23)
9	3/21	3/23	#10a Watch SB Udacity lecture 5 –
	L: Channels	P: Resources Activities	Key Relationships – (due 3/28)
		and Costs	
			#10b Channels and MVP
			presentation (dues 3/20)
10	3/28	3/30	#11a Watch SB Udacity lecture 6 –
	L: Key Relationships	P: MVP #1 & channels	Revenue – (due 4/4)
			#11b – Key Relationships
			Presentations – (due 4/6)
11	4/4	4/6	#12 – MVP# 2 and Revenue
	L: revenue	P: Key Relationships	Presentations – (due 4/13)
12	4/11	4/13	#13 – Lessons Learned #1 (due
	L: story telling for	P: MVP #2 & Revenue	4/20)
	effective presentations		
13	4/25	4/20	#14 – Lessons Learned #2 (due
	A: Lessons Learned	P: Lessons Learned	4/27)
	Presentation & Video #1	Presentation & Video #1	
14	4/25	4/27	

A: Lessons Learned Presentation & Video #2	P: Lessons Learned Presentation & Video #2	
5/2 Final Presentations		