

## User-Centered Innovation – spring 2014 (draft 1)

- Course:** ETM 556/656
- Instructor:** Shimon Shmueli, Adjunct Assistant Professor
- TA/GSA:** Nina Chaichi
- Time/Location:** Tuesday, 6:00-9:40 p.m.  
Oregon Institute of Technology, 27500 SW Parkway Ave, Wilsonville, OR 97070
- Email:** shimonpdx@gmail.com
- Websites:** We will use Google Drive for materials and course information. We will use Google+ for exchanges.
- Phone:** You can call me or send a text message during the week from 8:00 to 20:00 and during the weekend from 11:00 to 18:00
- Office hours:** Please coordinate ahead of time a phone or in-person meetings.

### Course Description

In 1977, Ken Olsen, the founder of Digital Equipment Corporation (DEC), said that “there is no reason for any individual to have a computer in his home.” DEC was a technology company that brought many breakthrough innovations to the market; breaking the mainframe dominance, ironically, was one of them. However, DEC failed to foresee the future role of computers in humans’ lives, a failure that arguably was a major factor in its eventual demise.

DEC is only one example, and indeed studies show that more than half of new products are rated as failures by the companies that launched them. While historically, most breakthrough innovations started with technology; the phone, TV, and computer, being some examples, just putting innovations out there does not assure market success. For market success, the user-centered approach is extremely important as it enables making those innovations desirable by customers and viable for manufacturers. More than that, breakthrough innovations are increasingly being introduced by companies that gain good insights to what consumers need and want. For that reason, in addition to heavy investments in technology research, Intel, among others, has also been sending many social scientists around the world in order to understand trends, behaviors, attitudes, aspirations, environments, etc. We can assume that the chips that will come out of fabs in the future will have some ‘real estate’ dedicated to on-chip algorithms/capabilities that result from such ‘soft science,’ (signal processing, fuzzy logic, emotional engines, etc. are some examples that come to mind).

This course introduces the students to the various approaches to innovation; their strengths and their weaknesses. We will put together a framework of Insights + Inspiration + Innovation and explore each of its three components. We will also introduce students to the increasingly prominent role of design in creating memorable experiences, and emotional connections with a product and/or the brands behind them. Students will learn how to identify opportunities, transform these opportunities into requirements and product concepts that cast an optimum balance between feasibility, viability, and desirability. We will try to reflect, feel, empathize, listen, brainstorm, collaborate, excite, get excited, and engage in some of the activities that are considered essential as part of the development of successful products from all stakeholders’ perspectives. We will study success and failure cases, do a semester-long project, and will enjoy perspectives of some industry thought leaders through readings, videos, and in-class visits.

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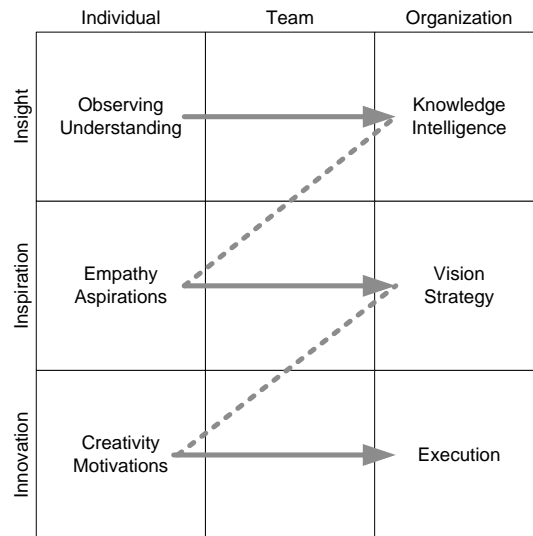
*“The real voyage of discovery consists, not in seeking new landscapes, but in having new eyes.”*

Marcel Proust

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## Course Objectives

The objectives of the course are along two dimensions: individuals leading teams and organizations through market/user insights, inspiration, and innovation. In this course we will attempt to enhance the capabilities of E&T managers in each of the intersections. This is a very ambitious goal that will be mostly achieved by teaching foundations and increasing awareness and motivation for lifetime of learning.



At the end of the term, students should be able to:

- Understand and appreciate the diversity of roles, disciplines, and mindsets in cross-disciplinary teams that are vital to bringing to market successful products.
- Understand the broad ideas and issues related to creativity and innovation, the user-centered approach, and the relationships among them.
- Use and deploy basic user insights and innovation methods and successfully recruit other resources to further develop those capabilities within organizations.
- Be an advocate of the user-centered approach and contribute to organizational cultures and processes.
- Most importantly, join the world-wide exchange, thinking, and practices towards better meeting of human needs through engineering and technology management.

## Class Policies

**Cyborgs:** Allowed, subject to human-centered etiquette.

**Assignments Submission:** Upload to your Google Drive space. Send all assignments as email by 2:00 p.m. of the due date specified in the Schedule and Assignments section below.

**Attendance/Participation:** You are expected to attend all sessions and actively contribute to the class exchanges.

**Collaboration:** I encourage collaboration among course students and teams. The only violation of honor code is failing to acknowledge the contributions of classmates or failure to disclose external resources.

**Email Use:** Please follow-up if you don't get a response by the end of the next day. Also, please

- Make sure the subject line is short and accurately reflects the email content.
- Do not bundle multiple unrelated subjects in one email and avoid piggyback emails.

### Approach

We will spend our class time discussing the reading materials, answering key questions, exchanging thoughts about variety of cases, sharing experiences, conduct in-class exercises, interact with guest speakers, etc.

I am passionate about innovation for the benefit of all stakeholders and society and will spare no efforts to make sure you get the best out of this course. But you need to support me by providing me with early feedback, indicate difficulties you may have, and by being an active participant in our learning experience.

### Textbooks and Readings

I will assign chapter readings from:

Norman, Don. *The Design of Everyday Things: Revised and Expanded Edition* (DOET)

I also recommend the following books for reference:

Sanders, Liz, and Pieter Jan. Stappers. *Convivial Design Toolbox: Generative Research for the Front End of Design*

Wujec, Tom. *Imagine Design Create* (PDF can be downloaded at <http://goo.gl/6kfkG>)

Additional readings and videos will be assigned by email during the term.

### Student Work/Assignments

#### Observations

Open your eyes, think critically... be an observer, gain deep understanding of users, build empathy, inspire, etc. These are some key words in the course objectives and during the term I would like to practice all of them.

Start capturing with your phone (or paper notes) things you observe daily as part of your professional life or as a consumer. These can be on the street, at home, at work, anywhere you are. Capture events, behaviors, product/service experiences, processes, interactions, everything that is relevant to the topics of our course.

Throughout the term write 8 observations, each will contain the following sections: Description, Key Lessons, and raw materials if relevant (pictures, notes, quotes, etc.)

One page per entry is typical (excluding pictures/diagrams if needed), but any length will do. Compile the observations in one document submit before the last session.

During the term I recommend that you present one of your observations to the class. Presentation should not exceed 10 minutes. Your class presentation can be in any format and there are no specific requirements to send me any documents or provide the class with any hand-outs. If you do have a presentation to share, in order to save time in class send it to me ahead of time. What do you get for that besides satisfaction and glory? At my discretion I will grant you 2 to 5 points towards the final grade.

#### Team Project

Student teams will conduct term-long projects. Each team will have 3-4 members selected by instructors in order to achieve diversity (including gender, cultural background, etc.)

The topics for the project will be the same for all teams, but they will be defined in a way that is broad enough to allow teams room for creativity and trial of various methods. The project should be technologically and economically feasible within the strategic time. A few examples are:

- Urban bicycling experience
- Keep homeless on the streets (but with a job and a home to get back to)

- Social networking for reduced carbon footprint
- Outpatient/home-care medicine
- Personal light urban transportation

The project assignment is to propose a product concept. The concepts will be presented to the company with the objective of getting funded for the full development of the product. For example, a Nike team may decide that there is a market opportunity and a need for personal backpack-size urban transportation device.

The objectives of the Project are for the team members to experience first-hand the various stages and tools used for creating user-centered innovations and to gain and share their experiences, insights and lessons learned. While the teams are expected to compete within their company for project funding, we keep in mind that good organizations also learn and refine their processes and methods over time and as such some of the project deliverables are lessons learned about things that went wrong, negative experiences, flops, etc. For example, a team may decide to do a project that explores and addresses the needs of the homeless and in the process discover that the homeless are suspicious and reluctant to be interviewed. The team may come up with an alternative to interviews or perhaps a way to encourage homeless people to interview and that is a lesson that we would like to be shared with the class.

At the last session of the term teams will present their projects. Presentations will last about 15 minutes and Q&A and discussions will follow for up to 10 minutes.

Team Project deliverables are:

- Project Report detailing process, methods, findings, offerings, and lessons learned.  
Due date: before last session.
- Project Presentation.  
Due date: before last session.
- Prototypes and other support materials in any form (optional).  
Date due: at presentation time.

In some of our class sessions we will discuss progress. Teams are also encouraged to bring up project-related issues/questions at the beginning of sessions.

All team members must participate in the final project presentation. Dress code is business casual.

The grading will be based on:

- Application of Research and Creativity methods learned in class
- Quality of proposed concepts. They must be feasible within 5 years, and beyond that they will be judged by originality, suitability to company and customers, desirability, and viability.
- Effective communication of the product/service concept

In principle all team members receive the same grades; however, at the end of a term I may ask students to fill out a peer assessment questionnaire and I will adjust individual grades in a range of +/-15% based on peer input.

For emails related to a team project, start the subject line with your team number.

### Briefs

Unless noted otherwise, for each reading or video material assigned, you should write your own takeaways in the form of 2-3 short bullet points (no more!), and 2-3 questions/issues you would like to discuss in class. Be prepared to read the brief in class and facilitate a short 5-10 min. class discussion based on your questions/issues.

## Grading

<b>Participation:</b>	30%	(Participations will be ranked at levels p=1, 2, 3; Grade = $p \cdot \{40/3\} + 60$ )
<b>Observations:</b>	15%	
<b>Team Project:</b>	25%	Project report
	20%	Presentation
<b>Briefs:</b>	<u>10%</u>	
	100%	

Final grading will be *Differentiated A-F*. Throughout the term grading will be based on a 0-100 scale and at the very end will be converted to the above based on the following: A 94-100, A- 90-93, B+ 87-89, B 84-86, B- 80-83, C+ 77-79, C 74-76, C- 70-73, D+ 67-69, D 64-66, D- 60-63, F <60. Standard rounding will be applied at the last step of final grade calculation ( $\geq 0.5$  rounds to 1,  $< 0.5$  rounds to 0).

## Schedule and Assignments

Note that the schedule is tentative and may change with prior notice.

Unless indicated otherwise, all assignments are due on the same day by 2:00 p.m.

### Class Schedule / Assignments & Preparation

#### Class meeting #1:

Introductions

Syllabus walkthrough

Team Project

- Discussion & topic selection
- Team assignments

Discussions

- Marketing and branding
- Design, experience, creativity, invention, innovation

#### Assignments & Preparation

- Pick your favorite product (not Apple's) or service (not Starbucks) and be prepared to discuss: why, how, what, where, when, who, whom...
- Watch and be ready to discuss:
  - Sir Ken Robinson: Do schools kill creativity?
  - Itay Talgam: Lead like the great conductors
  - Theo Jansen: My creations, a new form of life

Class meeting #2:

Project discussion

**Foundations**

- The big picture
- Products vs. services
- Key Definitions: experience, creativity, invention, innovation, holistic
- What is design
- Design for experience and emotions

Assignments & Preparation

- Read:
  - DOET
  - Attractive Design Works Better (write a brief)
  - Design Thinking by Tim Brown (write a brief)
  - Power of Design (no brief)
  - Watch IDEO Shopping Cart at <http://goo.gl/LF2aM> (no brief)
- Be ready to discuss in class your own definitions of:
  - Design (think of it in a broader sense, from the design of algorithm or a small machine element to urban design, and everything in between such as visual design (graphics, products), fashion, web, interiors, etc. What is the essence of all of these? What are the common characteristics?)
  - Experience
  - Creativity
  - Invention
  - Innovation.

Class meeting #3:

**Gaining insights to users**

- What are insights
- Voice of the customer (VOC)
- Qualitative research
- Ethnographic techniques

Assignments & Preparation

- Read:
  - DOET
  - Esomar Code (no need for a brief)
  - Indian Needs
  - Informing Our Intuition
  - Shared Phones Use (no need for a brief)
  - The Interpreter (no need for a brief)
- Watch:
  - Dev Patnaik - Wired to Care

Class meeting #4:

Guest Speaker: TBD

**Gaining insights to users (cont.)**

- Open innovation, democratized innovation, open source
- Lead-user research
- User/design research
- The empathic organization

Assignments & Preparation

- Read:
  - Psychopathology of Everyday Things
  - When Can You Trust Your Gut
  - Prototyping is the Shorthand of Design (no need for a brief)
- Watch:
  - Ellen Isaacs: Ethnography (no need for a brief)
  - Rebecca Saxe: How we read each other's minds (no need for a brief)
  - Before our Session 6 (May 10) watch the movie Objectified. It is available on Netflix or on YouTube.

Class meeting #5:

Project progress discussion

**What is design**

- The role of design in innovation and NPD
- The art-design continuum (engineering is art too!)
- Design tools: prototyping, iterations, and more...

**Personas, Scenarios, and Storytelling**

- Exercise building personas and scenarios

Assignments & Preparation

- Read:
  - The Small Book of Improv for Business (download and read any time - no brief)
  - DOET
  - Sparking Creativity in teams
  - Storytelling that moves people
- Watch:
  - Before our Session 6 (May 10) watch the movie Objectified. It is available on Netflix or on YouTube (no need for a brief)
  - Genevieve Bell: Context is Everything (optional, no need for a brief)

Class meeting #6:

Project progress discussion

**The creative process**

- Barriers: personality, affective/cognitive, organizations, cultures
- Bypassing/mitigating barriers
- Environments, cultures, and social factors that encourage creativity
- Types of thinking
- Systematic innovation methods

Assignments & Preparation

- Read:
  - DOET
  - Creative personality
  - Five myths of innovation
- Watch:
  - Objectified (movie). It is available on Netflix or YouTube (\$2.99). (no need for a brief)
  - Barry Schwartz: The paradox of choice
  - Steven Johnson: Where good ideas come from (no need for a brief)

Class meeting #7:

Guest speakers: TBD

**The creative process (cont.)**

Assignments & Preparation

- Read:
  - Age of consumer-innovator
  - Seven steps to better brainstorming
  - Sapper Stradivarius and Skylight (optional reading, no need for a brief)
  - Your choice of one of the following:
    - Visualising Gender Norms in Design
    - The Influence of Product Exposure on Trendiness and Aesthetic Appraisal (you can skip the quantitative portions, but not their conclusions)
- Watch:
  - First 1:45 min. of Personal Robots with Cynthia Breazeal

Class meeting #8:

**Design for experience**

- Interactions of humans and products

Assignments & Preparation

- Read:
  - A Case for Human-Centered Design in Cancer Care
  - Better Choosing Experience by Iyengar and Agrawal
- Watch:
  - Daniel Kahneman: The riddle of experience vs. memory (TED)
  - Paul Bloom: The origins of pleasure (TED)
  - Do Humans Empathize With Robots? (no need for a brief, but try to capture your feelings/emotions when you first viewed this video)

Class meeting #9:

**Putting it all together**

- Validity Vs. Reliability thinking  
- Design thinking  
- What is the right approach to innovation?  
- Global issues: user cultures, organizational cultures, needs, barriers

Assignments & Preparation

- Read:
  - Art of Integrative Thinking by Roger Martin
  - Design Thinking by Charles Owen (optional, no need for a brief)
  - Validity Vs. Reliability by Roger Martin
- Watch:
  - Tim Brown: From Design to Design Thinking



Class meeting #10:

Project presentations

Wrap-up discussion

Assignments & Preparation

- Watch:
  - Richard Galliano & Naoko Terai Tango Pour Claude (no need for a brief) In addition to enjoying the music, you are also welcome to (optional):
    - After listening, plot on one piece of paper (real paper with a pencil and eraser if needed) your “hierarchical emotional state diagram\*”
    - In addition, you can do the same using mind mapping software
    - What does music mean to you?
  - 1950's Two Ford Freedom (no need for a brief)

Have fun!