

MBA 290N-2, ME290P-1 and DSID125

Managing the New Product Development Process: Design Theory and Methods

Professors Alice M. Agogino, Sara Beckman and Emily Ford

Fall 2009

GENERAL INFORMATION

Faculty:

Alice M. Agogino, Department of Mechanical Engineering, 415 Sutardja Dai Hall (CITRIS Building), (510) 642-6450, agogino@berkeley.edu

Sara Beckman, Haas School of Business, F575 Haas School, (510) 642-1058, (415) 464-0517, beckman@haas.berkeley.edu

Emily Ford, California College of the Arts (CCA), (617) 628-4869, emilyford@alum.mit.edu

Teaching Assistants:

Lora Oehlberg, Berkeley Institute of Design, Hearst Mining Building, lora@berkeley.edu

Class Meetings:

Berkeley Class Meetings: MW, 11:00 a.m. – 12:30 p.m., 220 Cheit Hall

Berkeley Discussion Section: F 9-noon, C330 (Optional discussion section, studio time)

CCA Class Meetings: MW, 7:15 p.m. – 10:00 p.m.

Office Hours:

Beckman: M 12:30 – 2:00 p.m. or by appointment, F575 Haas School of Business

Agogino: W 12:30-1:30, F549 Haas School, or by appointment 415 Sutardja Dai Hall (CITRIS Building)

Ford: by appointment

Course Objectives:

This course is part of the Management of Technology program at the University of California, Berkeley. It is an operationally focused course, as it aims to develop the interdisciplinary skills required for successful product development in today's competitive marketplace. Engineering, iSchool and Business students from Berkeley and Industrial Design students from California College of the Arts join forces on small product development teams to step through the new product development process in detail, learning about the available tools and techniques to execute each process step along the way. Each student brings his or her own disciplinary perspective to the team effort, and must learn to synthesize that perspective with those of the other students in the group to develop a sound, marketable product. Students can expect to depart the semester understanding new product development processes as well as useful tools, techniques and organizational structures that support new product development practice. Although the course focuses on the application of these principles to new product development, they are more broadly applicable to innovation in general – of products, services, organizations, business strategies and governmental policies.

Expectations:

This is a three-unit graduate course. Accordingly, we have designed the course to demand approximately 9 hours per week of your time. We expect that each student will prepare for and attend all of the class sessions and will participate fully on a project team. This is particularly critical, as a number of the class sessions are working sessions during which we expect you to work with your team on your development project. We have tried to smooth the workload for the course so that it will remain relatively constant throughout the semester, and all requirements are clearly spelled out in this syllabus so that you can readily plan ahead.

Academic Integrity:

We encourage full group and class collaboration on all aspects of this course. We expect that all team members will contribute substantially to the project efforts, although some students will choose to devote themselves to the projects beyond what is required for the course. Students will be asked to critique and

contribute to the development projects of others in the class in a cooperative, supportive environment, and will be asked to submit critiques of their own group and group members during the course of the semester.

Reading Materials:

The primary reading material for the class is the textbook Product Design and Development (Fourth Edition) written by Karl Ulrich and Steve Eppinger. This book is a very basic text that provides a step by step view of how new product development processes are to be conducted. It is essential for the course, as it provides explicit instructions for each step of the process that your team will complete. Supplemental required course reading materials are available from a combination of Study.Net (www.study.net) and the course website (<https://bspace.berkeley.edu/>). On Study.Net, look for the course titled University of California, Berkeley -- MBA 290N-1: Managing the New Product Development Process (Fall 2009).

Grading:

Your course grade will be determined as follows:

- 20% on the quality of your preparation for and participation in class discussions
- 20% on the quality of your individual assignment solutions
- 10% for your final design journal and individual lessons learned
- 30% on the quality of your team's work on project-related assignments and deliverables
- 20% on the quality of your team's final project presentation and deliverables

At midsemester, we will ask for individual assessments of the contributions made by members of your team to the team project. These assessments will not be considered in preparing your final team grade.

Class Preparation and Participation:

Reading assignments and questions to guide your thinking about these assignments are given in the class schedule for each class session. We expect you to come to class prepared to discuss the readings and the suggested questions. In any given class session, a handful of students may be called upon specifically to speak to the readings and questions about them. If you have prepared according to the syllabus, you will have no problem responding when called upon. Your individual class participation grade will be based upon your in-class remarks during discussions and will be judged by the faculty.

Individual Assignments:

We have periodically assigned individual exercises to have you experiment with some of the concepts we are teaching. The syllabus makes clear which of these are to be turned in. The others are intended simply to prepare you for class discussion.

ALL INDIVIDUAL ASSIGNMENTS ARE TO BE SUBMITTED VIA THE BSPACE ASSIGNMENTS TAB UNDER THE APPROPRIATE HEADING PRIOR TO THE START OF CLASS ON THE DAY THEY ARE DUE. ALWAYS BRING ONE COPY OF YOUR HOMEWORK TO CLASS, AS WE WILL FREQUENTLY ASK YOU TO SHARE YOUR RESULTS.

Website Use:

We will make extensive use of the course Web site to both communicate information to you and to converse with you about your homework and your projects. You will find the course listed on <http://bspace.berkeley.edu/>. Once you have formed your project groups, we will set up group pages on which we expect you to store your working documents for your project. The faculty will review the group pages regularly to provide feedback on your work. Our experience is that the teams that heavily use their bSpace pages and email connections do better in the class, so we strongly encourage you to use them.

PROJECT BACKGROUND AND GENERAL INFORMATION

New Product Development Project:

The goal of this exercise is to learn principles and methodologies of product development in a realistic context. Most product development professionals work under tremendous time pressure and do not have an opportunity to reflect on the development process. In this course, the stress level will be low enough to allow time to experiment and learn. You will be asked to form project teams of 4 to 5 students, including a mix of Engineering, Business and iSchool students from UCB and Industrial Design students from CCA.

You will have opportunities during the first two weeks of class to scope out the possible projects and get to know potential teammates.

PROJECT BACKGROUND

Your challenge in the project portion of this course is to design a new product (a physical product, piece of software or service), test it on a consumer group, and produce an early prototype version of it. The goal of this exercise is to learn principles and methodologies of product development in a realistic context.

Guidelines for successful projects are as follows:

- There should be a demonstrable market for your product. One good way to verify a market need is to perform a competitive review and identify existing products that try to meet the need. Your product need not be a variant of an existing product, but the market need addressed by your product should be clearly evident. The product does not have to have a tremendous economic potential, but should at least be an attractive opportunity for a small firm.
- If you choose a physical hardware product (rather than a software user interface design or service), the product should have a high likelihood of containing fewer than 10 parts. Although you cannot anticipate the design details, it is easy to anticipate that an electric drill will have more than 10 parts and a garlic press fewer than 10.
- You should be confident of being able to build a reasonable prototype of the product. If you choose to make a hardware product, you must have access to prototyping capabilities such as machining processes and the skill sets to run them. In some cases a combination of a non-functioning “appearance” type model and a rough mechanical or electrical “working” prototype may be acceptable.
 - Your CCA team member should have access to shop facilities and, in many cases, has his or her own equipment.
 - If a UCB member of your team is interested in using the UCB Mechanical Engineering student shop, you need to go through safety training in the early part of the semester. Gordon Long is the Principal Lab Mechanician in charge of the student machine shop. You will need to visit him or Mick Franssen in 1166 Etcheverry Hall to make an appointment (642-4006). The qualification training is for education and safety purposes. It consists of three 1- hour sessions and a final 2 hour session on an actual hands-on application. He recommends that interested students sign up early during the first 3 weeks of the semester as training is on a first come-first served basis and the schedule gets full later in the semester. They will start the sign ups on August 26th and the actual training will be from Sept. 9th to October 23rd.
 - For insurance and liability reasons, UCB students are not allowed to use the shop facilities at CCA and the CCA students are not allowed to use the shop facilities at UCB.
 - For software user interface products, you should have access to proficiency in Web design tools or other software prototyping tools.
- The product should require no basic technological breakthroughs. We do not have time to deal with large technological uncertainties. In fact, we are more concerned that you have a specific market need in mind for your project than that you attempt to develop new technologies.
- You should have access to more than five potential users of the product (more than 20 would be nice.) You will need to talk with them or observe them when you launch your product and visit them with your product mock-ups or prototypes.
- Save any highly proprietary ideas for another context, as we will be open in discussing the projects in class and do not wish to be constrained by proprietary information.
- The most successful projects tend to have at least one team member with strong personal interest in the target market. We strongly encourage those of you thinking about starting your own companies to bring your ideas to the class.
- Most products are really not very well designed. (See, for example, the badly designed products documented at www.baddesigns.com.) Thus, if you pick almost any product that satisfies the general guidelines in this list, you will likely be able to develop a product that is superior to everything currently on the market.

Projects adhering to these guidelines will have the greatest probability of success.

PROJECT ASSIGNMENTS

Project assignments are intended to pace the development process for your product. There is little slack in this schedule and so assignments must be completed on or before the scheduled due date in order to maintain the project schedule. All project assignments are clearly spelled out in the class syllabus. Please post the items to be reviewed on bSpace.

All project deliverables (except the project proposal and the sketchbook/journal) are to be completed as a team. Please deliver all assignments according to the following format:

- Submit all project assignments and deliverables electronically. Unlike individual assignments that are to be submitted through the assignments tab on bSpace on the due date for the assignment, Project Assignments and Deliverables should be posted to *your group's page* on the class Web site where they will be visible to all members of your group as well as all faculty members (and coaches if you choose to include them on your site).
- Maintain a history of your project deliverables on your group Web site so that the faculty can review your progress over time, not just your most recent output. You should save formal project deliverables as well as interim documents on the site.
- Be concise. We like assignments that are 2-5 pages in length when possible. The exception to this guideline is concept sketches where one concept per page is preferred.
- ***With each project deliverable, please provide a short (less than one page) description of the process your group adopted in completing the assignment and reflections on its effectiveness.*** You should also comment on any lessons learned related to team dynamics or project management. (Individuals may choose to print copies of these reflections to include in their journals.)
- Please develop a naming scheme for the things you post to your group website that makes obvious what those things are. In particular, you should name the links to the files that are intended for faculty review by using as the first word of the name the letters DEL (short for deliverable). Follow DEL with an indication of what the document is. For example, when you submit your mission statement for faculty review, name the link DELmissionstmt.

Journal

Each individual in the class is **required** to maintain a design journal throughout the semester, to be turned in at the final project presentation, **Friday, December 14th**. It counts 10% towards your individual grade. The journal will be returned at the beginning of Spring Semester. This journal should include your individual thinking (both imagery and words) pertaining to your project. Think of it as a diary of sorts. You may sketch pictures, paste in pictures or business cards, write words, create mindmaps, or choose any other approach that works for you to capture your ideas, thoughts, and reflections about your product and your project. The journal should be used both to **capture ideas** about the product itself as you move through the process, but also **to document thoughts, reflections and insights** on the process of product development, group dynamics, project process, etc. Inventors use journals as it helps to document when they came up with an original idea (useful in the patenting process); engineers do this to work out complex technical details; and designers do this to generate lots of ideas (as ideas feed off of one another); project managers use journals as a management tool to generate "lessons learned" and "best practices" to help run future product development projects more effectively. You can tailor your journal to your own working style and your unique role within your project team. There are copies of exemplary design journals on the bSpace website if you would like to see what one might look like. Only the faculty will see these journals; no one else will see them unless you choose to share. Your design journal will count towards your individual assignments grade.

Working with Your Design Coach

We are privileged to offer you the opportunity to collaborate with some of the leading experts in product development from prominent firms in the Bay Area. Each team will be assigned a "design coach" who will mentor you throughout the product development process. The design coach is tasked with giving you a practitioner's viewpoint and advice on all aspects of your product and product development progress. Given the coaches' many years of experience in product development and coaching design teams for this course, you will find their input invaluable.

We recommend that you contact your design coach immediately after he or she is assigned to your team. We recommend that you designate one team member as the contact person. You should plan on having at least two to three meetings with your coach. We recommend meetings at three of the major milestones: mission statement formation, synthesis of customer and user needs/concept generation, design review or first pass prototype development and assessment. Meetings are typically 60-90 minutes long. You should coordinate the meeting logistics with your coach to suit your team's schedule and your coach's availability. You should prepare an agenda for the meeting ahead of time and share the agenda with your coach. At the meeting, we suggest that you not only brief your coach on your progress to date using your deliverables, design journals, and prototypes, but also come prepared with a specific objective. For example, you might brainstorm concepts or review your prototypes. Bring lots of questions and use the coaches' time wisely. Note that this does not mean that you have to have everything completed or answered before you go. In fact, the coaches can be most helpful when you are struggling with a choice or direction.

After each meeting, your team should *submit to the group's bSpace page minutes of the meeting and a summary of key learning from the meeting*. You may wish to share this with your coach, also.

Working with Your Team

For some of you, this will be your first experience in working on a collaborative, cross-functional team. Others of you will feel that you are old hands at this. Our experience is that many of you have worked on *group* projects in the past, but not necessarily as a *team*. We hope that through this course you will learn to differentiate the two. While there is no definitive evidence that increasing the level of functional integration is truly a guarantee for enhancing the performance of new products, studies have found that 97% of companies have used cross-functional teams at one point. Thus, it is critical to understand the nature of these types of teams. Part of the learning in this course is to assess patterns of cooperation and team dynamics and to reflect on both the behavioral and organizational challenges your team faces. While teams vary from semester to semester, we find that good organizational practices always benefit the entire team. Here are a few suggestions:

1. Commit to a regular meeting time. You should also set up modes of electronic communication for when you cannot meet together. Structure the meetings with an agenda, a time limit, and action items for which individuals are responsible. Do a wrap up at the end of each meeting so that everyone is on the same page. This will make the meeting productive and ensure concrete action items for future meetings
2. Please use the team bSpace e-mail alias to communicate with your team. It will also archive and thread your e-mails so that you can review past conversations. Store shared documents on the group page on the website.
3. Work together, not separately. Get to know each other's strengths, e.g., who knows PowerPoint, who's the CAD guru, who's good at running meetings, who's good at eliciting feedback from customers, etc. You will find that, unlike group work, you cannot just split up the work and staple it together when you next meet. There are many decisions you must make as a team.
4. Attempt as much open communication as possible. Discuss the means by which you wish to resolve problems as a group, and what escalation process you will use if problems persist. Decide, for example, when you want to involve the faculty or your design coaches in helping you resolve problems.
5. Use your mission statement to create a shared vision among the team members that will allow you to stay focused and on target.
6. Have fun!

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Managing the New Product Development Process: Design Theory and Methods
Class Outline and Assignment Schedule
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 Fall 2009

DAY	DATE	TOPIC
1 W	8/26	Introduction to New Product Development (NPD) Ch. 1: Introduction Watch: IDEO Video
2 M	8/31	Introduction to NPD: Development Processes and Organizations Ch. 2: Development Processes and Organizations Read: "Innovation as a Learning Process: Embedding Design Thinking" (bSpace)
3 W	9/2	Introduction to NPD: A Design Exercise Read: "Delta Design Exercise – The Design Task" (bSpace) <i>Individual Assignment: Prepare to play Delta Design Exercise role</i>
4 M	9/7	LABOR DAY HOLIDAY
5 W	9/9	Concept Development: Context and Planning Ch. 3: Product Planning StudyNet Case: Back Bay Battery (read background materials) <i>Individual Assignment Due: Reflect on Delta Design experience</i>
6 M	9/14	Concept Development: Context and Planning StudyNet Case: Back Bay Battery (play one round of the game) <i>Individual Assignment Due: List of 20 "bugs"</i> <i>Individual Assignment Due: Project proposal (first draft for feedback)</i>
7 W	9/16	Project: Proposal Presentation and Voting <i>Individual Assignment Due: Project proposal (final)</i> <i>Project Preferences due by 5 p.m. Thursday, September 17th</i>
8 M	9/21	Project: Project Launch Read: " The Trouble with Teamwork " (http://www.leadertoleader.org/knowledgecenter/journal.aspx?ArticleID=80) Guest speaker: Ulrich Nettesheim, Passages Consulting <i>Individual Assignment Due: MBTI Personality Test Results and Cognitive Style Survey</i>
9 W	9/23	Project: Project Management and Planning Ch. 16: Managing Projects StudyNet Reading: "Innovation at the Speed of Information" <i>In-class project exercise: Mission statement development and project planning</i>
10 M	9/28	Concept Development: Customer and User Needs Assessment Ch. 4: Identifying Customer Needs StudyNet Reading: Design Research (pp. 20-80) Guest Speaker: Michael Barry, Principal, PointForward <i>Individual Assignment Due: Customer and user needs interview</i> <i>Project Deliverables Due: Mission statement, customer user needs assessment plan, project plan</i>
11 W	9/30	Concept Development: Frameworks for Understanding Customer Needs StudyNet Reading: "Get Inside the Lives of Your Customers" Guest Speaker: Henning Fischer, Adaptive Path
12 M	10/5	Concept Development: Framing and Reframing Customer Needs <i>In-class project exercise: Framing and reframing customer and user needs</i>
13 W	10/7	Concept Development: Translating the Voice of the Customer (Creating Imperatives) Ch. 5: Product Specifications StudyNet Reading: "Turn Customer Input into Innovation" <i>In-class project exercise: Generating imperatives, design principles and specifications</i>
14 M	10/12	PEER REVIEW: MISSION STATEMENT AND CUSTOMER NEEDS REVIEW <i>Project Deliverables Due: Updated mission statement, customer/user needs data to date, proposed frameworks, lessons learned</i>

15 W	10/14	Concept Development: Considering Product Architecture Ch. 9: Product Architecture
16 M	10/19	Concept Development: Concept Generation Ch. 6: Concept Generation Read: " Creative Thinking Techniques " (http://www.virtualsalt.com/crebook2.htm) Guest speaker: Jono Hey, Jump Associates <i>In-class project exercise: Generating concepts</i>
17 W	10/21	Concept Development: Concept Selection Ch. 7: Concept Selection <i>Individual Assignment: Concept selection matrix application</i> <i>In-class project exercise: Selecting concepts</i>
18 M	10/26	Testing and Refinement: Concept Testing Overview Ch. 8: Concept Testing Ch. 12: Prototyping Guest Speaker: Lionel Mohri, IDEO
19 W	10/28	Testing and Refinement: Robust Design Ch. 13: Robust Design StudyNet Reading: "Boost your Marketing ROI with Experimental Design" <i>In-class exercise: Taguchi method</i>
20 M	11/2	PEER REVIEW STUDIO: CONCEPT DESIGN REVIEW <i>Project Deliverables Due: Updated mission statement, updated customer and user needs analysis, concept sketches (at least three final product direction renderings), concept selection matrices, lessons learned</i> <i>Individual Assignment Due: Complete peer review and team assessment survey</i> Read: Extremely Rapid Usability Testing (http://grouplab.epsc.ualgary.ca/grouplab/uploads/Publications/Publications/2009-ERUT-JUS.pdf)
21 W	11/4	Testing and Refinement: Evaluating Feedback <i>In-class project exercise: Debriefing feedback from 360-degree peer review and from concept design review</i> Guest Facilitator: Ulrich Nettesheim, Passages Consulting
22 M	11/9	Product Development Economics Ch. 15: Product Development Economics <i>In-class project exercise: Developing project economics</i>
23 W	11/11	VETERANS' DAY HOLIDAY
24 M	11/16	DfX: The Role of Design Ch. 10: Industrial Design <i>Individual Assignment Due: Bring a good or bad design to class</i>
25 W	11/18	DfX: Design for Manufacturing Ch. 11: Design for Manufacturing <i>In-class exercise: Assessing product manufacturability</i>
26 M	11/23	DfX: Design for Environment Read: Cradle to Grave – How Products Impact Natural Systems " Read: " The Cradle to Cradle Alternative " For the optional Friday lab, read: EIO-LCA Tutorial
27 W	11/25	LAB: Final Prototype Development, Testing and Refinement, Financial Analysis <i>In-class team time to prepare deliverables for 11/30 with faculty review and input</i>
28 M	11/30	PEER REVIEW STUDIO: CONCEPT PROTOTYPE AND DESIGN REVIEW TRADESHOW <i>Project Deliverables Due: Updated mission statement, updated customer needs, concept sketches and renderings, concept selection matrices, product specs and drawings, "proof-of-concept" prototypes, results of concept testing, financial analysis, lessons learned</i>
29 W	12/2	Supporting NPD: Intellectual Property Management Ch. 14: Patents and Intellectual Property Guest speaker: To be confirmed
30 M	12/7	Class Summary: Other Things You Can Do With This Process bSpace Reading: "If Managers Thought Like Designers"

		Guest speaker: Alonzo Canada, Jump Associates
31 W	12/9	Class Summary: Capturing Lessons Learned <i>Individual Deliverable: Lessons learned</i>
	12/13	FINAL EXAM: PRODUCT PRESENTATIONS AND JUDGING WELLS FARGO ROOM (HAAS SCHOOL OF BUSINESS) <i>Final Project Deliverables: Final mission statement, final customer needs summary, concept sketches and renderings, concept selection matrices, product specs and drawings, "proof-of-concept" prototypes, results of concept testing, financial analysis, lessons learned</i> <i>Individual Deliverables: Journal/sketchbook/diary and team evaluations</i>

**Managing the New Product Development Process: Design Theory and Methods
Detailed Class Syllabus**

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Required Textbook: Product Design and Development (Fourth Edition), Karl T. Ulrich and Steven P. Eppinger. In the outline below, CHAPTER X always refers to the readings from the text. The book is available from the campus bookstore, Amazon.com, and other sources.

Required Online Course Reader: Contains cases and supplemental readings. Changed slightly from last year. Course readers are available through a combination of Study.Net and the course website, bSpace. StudyNet provides all of the Harvard cases and readings. You can either order a reader to be printed and sent to you, or you can download the cases/readings as you need them and print them on your own.

**Class 1: Introduction to New Product Development (NPD)
Wednesday, August 26th**

Read CHAPTER 1: INTRODUCTION and watch the IDEO VIDEO at the following links:

- Part 1:
http://video.google.com/videosearch?rlz=1C1CHNG_enUS328US329&sourceid=chrome&q=ideo+de+ep+dive&um=1&ie=UTF-8&ei=1C5eStX7K5LgtgOo2uGnGg&sa=X&oi=video_result_group&ct=title&resnum=4#
- Part 2:
http://video.google.com/videosearch?rlz=1C1CHNG_enUS328US329&sourceid=chrome&q=ideo+de+ep+dive&um=1&ie=UTF-8&ei=1C5eStX7K5LgtgOo2uGnGg&sa=X&oi=video_result_group&ct=title&resnum=4#
- Part 3:
http://video.google.com/videosearch?rlz=1C1CHNG_enUS328US329&sourceid=chrome&q=ideo+de+ep+dive&um=1&ie=UTF-8&ei=1C5eStX7K5LgtgOo2uGnGg&sa=X&oi=video_result_group&ct=title&resnum=4#

We will cover course logistics and requirements and then develop the motivation and framework for the course. Come to class prepared to discuss why new product development is such a critical process to manage and what the key activities in new product development entail.

**Class 2: Introduction to NPD – Development Processes and Organizations
Monday, August 31st**

Read CHAPTER 2: DEVELOPMENT PROCESSES AND ORGANIZATIONS and the paper INNOVATION AS A LEARNING PROCESS: EMBEDDING DESIGN THINKING (on bSpace). We'll introduce the basic structures that are used to manage new product development processes in different environments (e.g., Agile, waterfall), and the organizational designs that accompany them. Consider the thought questions at the end of Chapter 2. How is the process described in your book similar to/different than the process described in the paper?

**Class 3: Introduction to NPD – A Design Exercise
Wednesday, September 2nd**

Read DELTA DESIGN EXERCISE – THE DESIGN TASK (on bSpace) and prepare the role assignment you were given. Make sure that you thoroughly understand the role you are to play. If you do not, please ask questions of your trainer to clarify your position. Prepare any materials you believe you will need to play the role. **DO NOT discuss** the other three roles with others in the class. On the day of class, come to the classroom for your room assignment, go straight to that room and convene your team as quickly as possible, as you will find that 1 1/2 hours is quite short for accomplishing this work.

At the end of the exercise, you will be asked to submit a sheet of paper for each team that provides all of the completed calculations for that team and a photo of your final design. The calculations must be submitted in class; the photo can be sent after class.

Class 4: LABOR DAY HOLIDAY
Monday, September 7th

Class 5: Concept Development – Context and Planning
Wednesday, September 9th

We'll start the class session by debriefing your experience with the Delta Design exercise.

INDIVIDUAL ASSIGNMENT DUE: Delta Design Reflections

*Write a one-page paper with your reflections on the Delta Design Exercise. What did you notice about the design process itself? What did you notice about the dynamics on your team? What would you change were you to go through the design exercise again? Upload your paper to the **assignment** box on bSpace under "Delta Design".*

Read CHAPTER 3: PRODUCT PLANNING and the background materials for the BACK BAY BATTERY case (available through Study.Net). One of the critical activities that a firm undertakes is planning its product portfolio. This plan in turn drives the definition of the individual product development projects and the firm's investment in them. In this session, we will introduce the basic tools used for doing product planning, and prepare you to engage in a simulation associated with the Back Bay Battery case in the following class session.

Class 6: Concept Development – Context and Planning
Monday, September 14th

INDIVIDUAL ASSIGNMENT DUE: Twenty Bugs

We are all capable of identifying market needs and thus generating ideas for new products, in part by noticing the deficiencies in the products we use in everyday life. To prove to yourself that you can identify market needs, generate a list of at least 20 "bugs." Designers at the product design firm IDEO use "bug lists" to record their observations of products and situations where products failed to meet the actual conditions of use. This list should include any observation or annoyance that comes to your mind. Note that we are looking for a list of "bugs" (e.g., my vegetable peeler hurts my hand when I peel potatoes) rather than a list of product solutions (e.g., a vegetable peeler with a soft handle). In other words, do NOT invent solutions to the problems you see – just state the problem. Upload your bug list to the course website under "assignments" and "twenty bugs".

INDIVIDUAL ASSIGNMENT DUE: Draft Project Proposal

Please see detailed instructions under 9/16. Submit the one-page description of your project to the "assignments" tab "draft project proposal" by 5 p.m. on Monday, September 14th.

Play one practice round of the BACK BAY BATTERY simulation available through your subscription to Study.Net to familiarize yourself with the information available to you and the decisions you will need to make. Come to class prepared to play multiple rounds of the game during class and then compare and discuss results.

Class 7: Project Proposal Presentation and Voting
Wednesday, September 16th

INDIVIDUAL ASSIGNMENTS DUE: Project Proposal and Project Preferences

Project proposal (submit one-page written proposal to “assignments” tab “final project proposal” and project presentation to “assignments” tab “project proposal presentation” no later than 5 p.m. on Tuesday, 9/15

Project preferences (submit per instructions by 5 p.m. on Thursday, 9/17)

Overview

Following is the process we will use to generate the project ideas for this semester’s teams, document those ideas, present them to the class, identify individual project preferences and finally form project teams. Each student is to develop a project proposal. This proposal may be based on one of the bugs on the “bug list” or may be based on a market need that interests the student. The proposal should be based on a **market need, not on a proposed solution.** We encourage students who want to do something to benefit the local community. In past years, for example, teams worked on protective clothing for farm workers who handle pesticides, on emergency water supply, protection for pediatric poisoning, etc. We also strongly encourage students to submit proposals for projects they are already working on, or companies they want to start themselves. Revolution Foods and PACTApparel were both class projects, for example. We are happy to discuss these ideas with you ahead of time. Remember, however, that you must be able to visit members of your target customer group, observe them and interact with them.

Individual Project Proposal

Your one-page proposals should include:

- A brief, descriptive project title (2-4 words)
- Your name, phone number, e-mail, and school/department affiliation
- A description of the market opportunity you have identified. Your description may include any of the following: Documentation of the market opportunity, shortcomings of existing competitive products, and/or definition of the target market and its size. Your written descriptions should be supported by at least one photographic image.

Example:

Market Opportunity – coping with long checkout lines in grocery stores

Photograph: woman standing in line, looking very bored or impatient

- Please do **not** present *product ideas* at this point. Our strict focus in this phase of the course is on the *market opportunity* – the unfilled need or unsolved problem – and not on solution concepts. We will check your submissions on Monday/Tuesday and have you revise them if they are too solution focused.

These proposals will be posted to a location where all participants in the class can see them.

Class Presentation

Come to class prepared to give a VERY SHORT (i.e., 45 seconds), yet convincing, presentation of your project proposal. Please prepare three slides that you can present in 15 second each that clearly communicate the market need on which you would like your classmates to work with you. We will collect all of the slides into a single presentation that we will run with PowerPoint’s timed presentation feature. See http://en.wikipedia.org/wiki/Pecha_Kucha for a description of this style of presentation. Your slides should communicate the following:

- The first slide **MUST** include your name and school/department affiliation
- A verbal and visual demonstration of the product opportunity you have described in your proposal. Given that the audience will be able to read your written proposal at their leisure, you might spend your time explaining the richness of the market opportunity or demonstrating existing competitive products. We will **NOT** have time for you to present any PowerPoint slides, however, so use other means of communicating your idea.
- Any special skills or assets you have (marketing expertise, access to a multimedia computer, user interface design expertise). Any special skills or assets you need to complement yours in developing this market opportunity.

The slides are due absolutely **NO LATER THAN 5 P.M. on TUESDAY, 9/15** so that we can get the full presentation assembled for the following day.

Submitting Preferences

By 5 p.m. on Thursday, September 17th you must decide on your project preferences. You should list the FOUR projects on which you would most like to work in order of preference. If you would like to work with a particular group of classmates, recalling that your group must contain engineering, MBA and industrial design students please submit their names as well. They must submit your name as well for us to assign you all to the same team. Submit your preferences per the instructions on bSpace. We will process your preferences and assign teams. You will be notified of team assignments no later than Monday, September 21st. There is a good chance we will ask you to vote a second time after we have eliminated some of the projects in the first round, so stay tuned.

Class 8: Project Organization and Launch Monday, September 21st

Read: “[The Trouble with Teamwork](#)”

(<http://www.leadertoleader.org/knowledgecenter/L2L/summer2003/lencioni.html>)

Guest speaker: Ulrich Nettesheim, Passages Consulting

During this class session, we will talk about team dynamics and interactions as being critical to new product development success. We’ll conduct a team launch exercise in which you and your teammates debrief your MBTI profiles and the other questions on the survey. Ulrich Nettesheim, an expert in organizational design and coaching as well as a veteran of this class (<http://www.passagesconsulting.com/page/ulrich.htm>), will be here to conduct the team launch exercise.

INDIVIDUAL ASSIGNMENT DUE: Complete the team launch survey available through the SurveyMonkey link. (You will need to know your Myers Briggs profile in order to complete the survey. Students may use the prior results of having taken the test if available. If you don’t have your profile, please take the test per the instructions below.)

- The **Jung Typology Test** and information about it are available at www.humanmetrics.com. Read the background on the test and then take and score it.
- After you have the results of your test, go to the SurveyMonkey website listed on bSpace and complete the survey there. Bring your answers to class to use in a team launch exercise.

Class 9: Project – Project Management and Planning Wednesday, September 23rd

Read CHAPTER 16: MANAGING PROJECTS and INNOVATION AT THE SPEED OF INFORMATION (on Study.Net). We’ll introduce some basic tools for managing new product development projects. How would the tools presented in the readings have helped you in your Delta Design exercise? Did you experience any of the feedback loops described in the *Innovation at the Speed of Information* article?

During this class, we will work with your teams to help you make progress on each of the following tasks:

- Prepare a Mission Statement (as shown in chapter 3). Use this assignment to refine the definition of your project and to agree as a team about what your objectives are.
- Prepare a customer/user needs assessment plan (following the guidelines in Chapter 4) that answers the following questions: Who is your customer? How will you access your customers? What approach will you take to collecting information (e.g., interviews, observation, surveys)? What types of information will you gather? How will you document your information gathering (e.g., words, images)? Your goal is to learn new information about your customers and their needs -- information beyond your original assumptions. Note that you have individual assignments to complete customer interviews by Monday, September 28th. You may wish to coordinate who you will interview at this meeting.
- Prepare a project plan using the course syllabus as a guide.

These three items should be posted to your TEAM's bSpace site for review by the course faculty by Monday, September 28th.

**Class 10: Concept Development – Customer and User Needs Assessment
Monday, September 28th**

INDIVIDUAL ASSIGNMENT DUE: Choose a product that competes with or serves a similar purpose to the one your project team is developing. Interview a potential or current user of the product about what they like and dislike about the product. This interview can be done very informally in 5-10 minutes. Record what your interviewee says and interpret the data in terms of customer needs as described in Chapter 4. Pay particular attention to the guidelines provided for translating customer statements into needs statements. Prepare a one-page summary of what you have learned about the interview process. Submit both the record and interpretation of customer needs and your page of lessons learned to the assignments tab under customer interview.

PROJECT DELIVERABLES DUE: Submit your Mission Statement, Customer/User Needs Assessment Plan and Project Plan. As with all project assignments, include a short discussion of the process you used, lessons learned, and any observations you have about your team. Submit these to your group's page.

Read CHAPTER 4: IDENTIFYING CUSTOMER NEEDS and read DESIGN RESEARCH (STUDY.NET) in preparation for class discussion. We will have a guest speaker, Michael Barry, from the design firm PointForward (www.pointforward.com) who will talk about user needs understanding, and in particular the role of ethnographic research in understanding customer needs.

**Class 11: Concept Development – Frameworks for Understanding Customer Needs
Wednesday, September 30th**

Read GET INSIDE THE LIVES OF YOUR CUSTOMERS. We have a guest speaker coming from Adaptive Path to present different ways of analyzing customer and user needs data. In “design thinking” terms, we call this framing and reframing. You should think about how you might apply these frames to your projects once you have learned them.

**Class 12: Concept Development – Framing and Reframing Customer Needs
Monday, October 5th**

We'll use this class time to work with you on applying some of the framing and reframing tools to your project data. Please bring all of your customer and user needs data – interview notes, photographs, etc. – to class with you to use in these in-class exercises. In addition, please individually identify 3-5 solutions that compete with your potential solution to solve the same customer/user needs. Bring information about each of them to the class session to share with your teammates and use in the framing/reframing exercises.

**Class 13: Concept Development – Translating the Voice of the Customer (Creating Imperatives)
Wednesday, October 7th**

Read CHAPTER 5: PRODUCT SPECIFICATIONS and TURN CUSTOMER INPUT INTO INNOVATION. In this class we will move a little ahead of where your project should be to introduce you to the next step of the process – translating customer and user needs information into specifications and imperatives. We'll introduce the basic concepts of generating specs and imperatives, and then have you do some exercises with your project data to play with the concepts.

**Class 14: PEER REVIEW PRESENTATION – MISSION STATEMENT AND CUSTOMER/USER NEEDS REVIEW
Monday, October 12th**

PROJECT DELIVERABLES DUE: Updated mission statement, customer/user needs analysis, and the usual short discussion of the process you used, lessons learned, and any observations you have about your team.

Your project should now have completed a first pass at the following activities: Gather raw data on customer needs (through whatever means you deem most appropriate to your potential market). Generate a list of customer needs for your product and organize it hierarchically into primary, secondary and tertiary needs as described in your book. Identify three or four needs that you feel are important, but latent and not addressed by current products.

Most of you will find that your Mission Statement continues to evolve throughout the product development process as you learn more about your target market and gather feedback from faculty and others. You should continue to update your Mission Statement as you gather new inputs (archiving the old ones on the Web site).

This will be the first of three peer reviews you will have on your product development project. During class we will pair you up with another team or two to present and give feedback to one another. Come prepared to share: your mission statement, as is shown in your textbook, a brief review of the means used to collect customer and user needs information, a summary of the identified customer and user needs, one of your most interesting use scenarios, and a summary of lessons learned in the process to date. This is an opportunity to receive feedback from and give feedback to your classmates. It is also an opportunity to learn about new product development processes by observing what others have done on and learned from their projects. Here are some guidelines from CCA on engaging in critiques.

WHAT WE CRITIQUE

1. Content: Does it make sense? Is it clear? Does it communicate what the designer claims? Is it interesting?
2. Process: Did the designer exploit the process(es) enough? Could more work have been done?
3. Grounding/defense: Can all of the designer's decisions be adequately defended?

HOW WE CRITIQUE

BE CONSTRUCTIVE.

We're all guilty of delivering too many barbed comments. Try to be constructive in your criticism (Something like "This part is successful because—; this part isn't because—; Maybe you could think about—"). Don't say every piece of work is great. The result is that nobody learns anything. It's not about "good" and "bad", more "successful" and "unsuccessful." (Reserve "good" and "bad" for your dog.)

THE GREAT BIG NO-NO

The phrase "I like it" without an explanation is forbidden. Learning to talk clearly and perceptively about other people's work takes effort and practice. The more you do it, the more eloquent you will become.

FINALLY,

It is far easier to determine if a concept, typeface, size, color, position, relationship, etc. is appropriate, awkward, elegant, oblique, or nasty if you have something to compare it to. You will learn more quickly (and become a better designer) if you make a habit of bringing multiple solutions to class for critiques.

Class 15: Concept Development – Considering Product Architecture Wednesday, October 14th

Read CHAPTER 9: PRODUCT ARCHITECTURE. We will focus our discussion in this session on the definition of product architecture and the implications of product architecture decisions for product development, marketing, customers, etc. How might your product benefit from a product architecture/ platform strategy? Be prepared to discuss the relationship between product architecture and mass customization.

Class 16: Concept Development – Concept Generation Monday, October 19th

This class session will focus on brainstorming and "ideation" techniques used by new product development teams to generate product ideas from their understanding of customer wants and needs and of the available technologies. Read CHAPTER 6: CONCEPT GENERATION and CREATIVE THINKING TECHNIQUES

(<http://www.virtualsalt.com/crebook2.htm>). Jono Hey from Jump Associates will lead our discussion of concept generation as well as some exercise for your project teams.

Class 17: Concept Development – Concept Selection
Wednesday, October 21st

INDIVIDUAL ASSIGNMENT DUE: Chapter 7 describes concept screening and concept scoring matrices as a means of selecting among competing ideas for products you might develop. In this assignment, we ask that you apply these screening and scoring tools to assess a set of possible names for your project team’s company. "Generate at least 10 dot-com available names for your product (company). You may find the Lingzini naming tool useful for this task (<http://www.lingzini.com>). Then create selection matrices to evaluate the names you have created. Use a screening matrix to reduce the number of names to be evaluated to a smaller number (say 3-5) and then use a scoring matrix to evaluate the remaining names. The article "How to Create a Great Product or Company Name" on the Lingzini website may help you get started." Submit your work to the “assignments” tab under “concept selection” and bring copies to class to share with your teammates. If you like, you may register the name you’ve chosen for later use.

Once you have generated a set of possible product concepts, you must identify the one or ones that you will actually work on. During this class session, we review methodologies for choosing from among the options. Read CHAPTER 7: CONCEPT SELECTION. The concept selection process as described in the chapter seems quite straightforward. Was it as straightforward when you applied it to actual products? What do you like and dislike about the method?

Class 18: Testing and Refinement – Concept Testing Overview
Monday, October 26th

Read CH. 8: CONCEPT TESTING and CH. 12 PROTOTYPING. Lionel Mohri from IDEO will join us today to introduce tools and techniques for prototyping and testing your product concepts.

Class 19: Testing and Refinement – Robust Design
Wednesday, October 28th

Read CHAPTER 13: ROBUST DESIGN and BOOST YOUR MARKETING ROI WITH EXPERIMENTAL DESIGN. We’ll continue our conversation about product testing with exploration of a specific tool for product design – design of experiments. We’ll do an in-class exercise to help you understand how the tool works.

Class 20: PEER REVIEW STUDIO – Concept Design Review
Monday, November 2nd

Read EXTREMELY RAPID USABILITY TESTING to get ideas as to how you can best use the time you will have with your fellow students in this session.

PROJECT DELIVERABLES: Updated customer needs, concept generation sketches, three concept renderings, and concept selection matrices, lessons learned

INDIVIDUAL ASSIGNMENT DUE: Complete the on-line peer review and team assessment survey as per instructions on bSpace. This MUST be completed by 11:00 a.m. on Monday, November 2nd for us to be able to provide feedback to your entire team on Wednesday.

Session objectives:

- Update your classmates as to progress on your product development effort.
- Make the first “public” presentation of your “proof-of-concept ideas”
- Gather feedback from classmates on your concept design and mockups

For this session:

1. Prepare a THREE-SLIDE summary of your:
 - Mission statement
 - Target market
 - Salient customer needs

Plan to orally present this one page summary briefly at the beginning of the class in 1 minute, 20 seconds per slide. Submit the slides to beckman@haas.berkeley.edu no later than 9 p.m. on Sunday, November 1st. We'll follow the same presentation format that we used in the proposal presentations. This will bring the entire class up to speed on your project before they review your work.

2. Prepare your "proof-of-concept" sketches, product renderings and early prototypes so that everyone can understand your ideas. After the brief review at the beginning of the class, we will spend about 50 minutes in a "tradeshow" environment during which you will wander around the classroom to look at the work. You are welcome to bring portable computers to set up your images. You should plan to handle any arrangements for using computers on your own.

To support your concepts, you should have the following materials available. (Each team will likely have done different versions of these. Use what you have already developed.)

- Customer/user needs hierarchy
- Mapping of customer needs to specifications
- Concept sketches
- Product renderings or mockups (3D renderings, early physical or web mockups)
- Concept screening and scoring matrices
- Reason for choosing the concept(s) you have developed for today

As we will only have about 50 minutes for this session, you should plan to have group members rotate responsibility for showing the concepts so that other group members can circulate. Think about the best way to efficiently and effectively collect feedback from your classmates. You may wish to have a mini-survey available for them to complete. Remember that each student will only have about 5 minutes to spend reviewing your work; so make your presentation as succinct as possible.

From this point forward, your focus will be on developing and testing your product concept with your customer base, obtaining feedback, incorporating it into your product, and preparing intermediate and final product prototypes. You will also need to develop a plausible business model and perform a rough financial analysis of the product. All of this will be required as a deliverable in your third peer review studio on Nov. 30.

Class 21: Testing and Refinement – Evaluating Feedback **Wednesday, November 4th**

This class session will be dedicated to giving you the feedback from your team survey and letting you process that feedback with organizational design experts. We will also briefly discuss what you learned from the Peer Review feedback on Monday. Ulrich Nettesheim will return to facilitate this session.

Class 22: Product Development Economics **Monday, November 9th**

Read CHAPTER 15: PRODUCT DEVELOPMENT ECONOMICS. We'll briefly review the concepts covered in the chapter, share a spreadsheet that has been set up for you to use to develop the economics for your own projects, and then lead you through an in-class exercise to launch your work.

Class 23: VETERAN'S DAY HOLIDAY **Wednesday, November 11th**

Class 24: DfX – The Role of Design
Monday, November 16th

In this class we'll explore the topic of design, and the role of "design" in the new product development process.

***INDIVIDUAL ASSIGNMENT DUE:** Please bring to class an example of a product or packaging that represents for you good or bad design. You may wish to look in particular at either solutions that are in the space of your project, or that might provide inspiration for your project designs. Be prepared to discuss briefly why you feel the design is good or bad, and what the company did to achieve this. Either bring the physical object or a photograph of it to class to share with others. Write a one-page summary of why you think the product represents good or bad design and submit it to the "assignment" tab under "good/bad design".*

Class 25: DfX – Design for Manufacturing
Wednesday, November 18th

Read CHAPTER 11: DESIGN FOR MANUFACTURING. Design for manufacturing is one of the many "design fors" that a product development team must undertake. In this class session we'll talk about the various "design for x" activities, including manufacturing. Consider thought questions 1 and 2 at the end of Chapter 11. We'll disassemble and reassemble a product in class in order to evaluate its design-for-assembly merits.

Class 26: DfX – Design for Environment
Monday, November 23rd

Visit [CRADLE TO GRAVE – HOW PRODUCTS IMPACT NATURAL SYSTEMS](#), click through each of the six stages and read the first page that pops up. Following the links on each page is encouraged but entirely optional, except for the three additional links under the "emissions" page, which you should follow. What does designing products for environmental soundness entail? How might you make tradeoffs among cost, quality, features and environmental soundness when designing a product? What is sustainable design? Scan [THE CRADLE TO CRADLE ALTERNATIVE](#) website. What is the difference between the the "cradle to grave" perspective and the "cradle to cradle" alternative? How might you redesign or manufacture your product with this perspective in mind?

We will also hold a Friday tutorial (date TBA) on using a Life Cycle Analysis software tool. Read the [EIO-LCA Tutorial](#) in preparation for this Friday Lab (http://www.eiolca.net/tutorial-j/tut_1.html)

Class 18: LAB – Concept Selection and Concept Testing Plan
Wednesday, November 25th

This is an open class period during which your team can meet to work on your deliverables for 11/30. The faculty will be available to meet with your teams.

Class 28: PEER REVIEW STUDIO – Concept Prototype and Design Review Tradeshow
Wednesday, November 30th

***PROJECT DELIVERABLE:** Updated mission statement, updated customer needs, concept sketches and renderings, concept selection matrices, product specifications and drawings of final concept, and "proof of concept" prototypes, results of concept testing, financial analysis, lessons learned.*

Session objectives:

- Update your classmates as to your near final product development effort.
- Make the first "public" presentation of your "proof-of-concept" prototype

- Gather feedback from classmates on your prototype

For this session:

1. Prepare a short presentation that you have at your station that includes:
 - Mission statement
 - Target market
 - Salient customer needs
 - Breadth of concepts generated
 - Concept selection matrices

Have this presentation available at your station for review by your classmates.

2. Prepare your "proof-of-concept" prototype. Come to class prepared to show it in a "tradeshow" environment like that used in the prior peer review. Consider this a very early "dry run" for your final tradeshow presentation.

In addition to your "proof of concept" prototype, you should have the following materials available. (Each team will likely have done different versions of these. Use what you have already developed.)

- Customer/user needs hierarchy
- Mapping of customer needs to specifications
- Concept sketches
- Product renderings
- Concept screening and scoring matrices
- Reason for choosing the concept(s) you have developed for today
- Financial model and analysis

As with the previous peer review studio, you should plan to have group members rotate responsibility for showing the prototype so that other group members can circulate. Again, we should have about 50 minutes for this session. Think about the best way to efficiently and effectively collect feedback from your classmates. You may wish for your peers to test your final design and "proof of concept" prototype. Remember that each student will only have about 5 minutes to spend reviewing your work; so make your presentation as succinct as possible.

From this point forward, your focus will be on testing and refining your product design and prototype with your customer base, obtaining feedback, incorporating it into your product, and preparing the final product prototype and financial analysis.

Class 29: Supporting NPD – Intellectual Property Management Wednesday, December 2nd

Read CHAPTER 14: PATENTS AND INTELLECTUAL PROPERTY. Intellectual property protection can be an important issue in new product development efforts. We'll have a guest lecturer speak with us about how to get intellectual property protection and what strategies various firms might choose. If you are interested in doing a patent search, see <http://www.patents.ibm.com/ibm.html>.

Class 30: Class Summary – Other Things You Can Do With This Process Monday, December 7th

Read IF MANAGERS THOUGHT LIKE DESIGNERS. We will have a guest speaker who will talk about the process of design and how it can be applied much more widely than just to product development.

Class 31: Class Summary – Capturing Lessons Learned Monday, December 10th

INDIVIDUAL ASSIGNMENTS: Reflect on the experience you have had working with your team in developing your product this semester. Capture 8 – 10 key lessons you have learned from the experience.

Write them up and submit them to the “assignments” tab under “lessons learned. In addition, transcribe each of them onto a post-it note (one per post-it). ***Bring those notes to class with you to share.***

We will spend the last class session sharing lessons learned and synthesizing those lessons across the projects.

Final Tradeshow

Sunday, December 13th, 1 - 4 p.m.

INDIVIDUAL DELIVERABLES:

- Turn in the journal you have been keeping throughout the semester. It will be returned at the beginning of the Spring semester.
- Complete the team evaluation survey

PROJECT DELIVERABLES:

- Final mission statement
- Final customer user needs assessment including whatever frames, personas, scenarios etc. you used
- Concept generation, showing the breadth of concepts you generated throughout the semester
- Concept selection matrices, particularly that highlight how you got to your final concept
- Concept testing results and how those results affected your final design choices
- Financial analysis
- A photo of your final prototype. We may ask to keep some of your prototypes, but cannot keep them all, so please submit a photo of the final solution.
- Softcopy of your presentation slides
- All of these materials should be available to course faculty in a SINGLE FOLDER on your bSpace project page.

Group Presentation of Process and Prototype – Reception

The New Product Development Trade Show will take place Sunday, December 13th between 1 – 4 p.m. Attendance at the final exam IS MANDATORY. During the tradeshow, you will have the opportunity to display your product prototype to your peers, course faculty, the design coaches and a group of invited judges and guests.

Prepare a 10-minute presentation that describes your final product and the process you went through to arrive there. The presentation should be of the quality to convince a top management group to purchase the rights to your product or to fund its final development and launch. An effective presentation includes a slide presentation along with a display of the prototype. Your presentation should not only attempt to sell your prototype to the audience, but should also make clear the process you went through to develop the prototype. We suggest that you present:

Your mission statement

A summary of your customer/user needs analysis

A couple of concepts you considered as alternatives to the one you developed

A summary of your financial analysis

A demonstration of your product prototype

A list of the most important lessons you learned about the NPD process and teams

This event will be held in the Wells Fargo Room on the 5th floor of Cheit Hall.