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<td>May 12, 2003</td>
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Mondays 9:00am - 11:50am in room C3.15
266A Section 01 Course Syllabus
New Product Development

March 31 to May 19, 2003 • 9 Sessions
Spring Quarter 2003, Mondays, 9:00am-11:50am, Room C3.15

Topic I: PRODUCT DEVELOPMENT PROCESSES
Topic II: VOICE OF THE MANUFACTURER
Topic III: LISTENING TO CUSTOMERS
Topic IV: PROTOTYPING & TESTING
Topic V: MARKETING MEETS DESIGN

INSTRUCTOR:

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GRADING

1. Written Assignments: 30%
2. Examination: 30%
3. Project: 20%
4. Contributions to class discussion: 20%
WRITTEN ASSIGNMENTS

There will be several written assignments due during the semester, including:

- **Due Friday, April 4**: Team list and project description paragraph
- **Due Monday, April 7**: Midwest industries team assignment
- **Due Friday, April 11**: Conjoint homework
- **Due Monday, May 12**: Parallel & Sequential Prototyping Homework
- **Due Monday, May 12**: Team project final report
- **Additional short assignments** may be assigned during the semester

EXAMINATION

There will be an 80 minute, short answer and/or multiple-choice, in-class exam on Monday, May 12, beginning at 9:00am. Students who have done the readings and attended all class sessions will have an advantage during this exam.

PROJECT

**Objective**: The project provides an opportunity for in-depth study or application of the techniques or concepts discussed in class. The project should be done in groups of four to five. A number of possible topics will be provided, but this list is by no means exhaustive and students are free to propose their own ideas. If you are having trouble selecting a project, or would like additional alternatives, please talk to Professor Dahan or the course TA.

**Deliverables**: A project outline will be due relatively early in the semester, followed by a mid-term progress report, and a final report (oral and written). Specifically:

- **Fri., April 4, 2003**: One-paragraph description of project is due along with team list.
- **Mon., May 12, 2003**: Written report is due. Also, each group will schedule and deliver a 20 minute oral presentation summarizing the results of their project to Professor Dahan this week.

CLASS DISCUSSION CONTRIBUTIONS

A great deal of learning comes from hearing what your colleagues have to say and responding to it. You will be expected to have completed the readings prior to each class and prepared the assignment questions. You may be “cold-called.” Attendance at EVERY session is mandatory (please do not schedule travel or interviews during any class meeting). Absences will affect your grade adversely. Quantity and quality of participation are both important. The grading formula will be along the following lines:

\[
CDG = \sqrt{Qty \times \text{Avg. Score}} - \text{Absence Penalty},
\]

where CDG is the class discussion grade, Qty is the number of significant contributions, and Avg. Score is the average quality over all of the contributions. If you are having any difficulty participating, please discuss this with Professor Dahan.
Contents of the course reader

Course Syllabus (you’re reading it)
“SweetWater.” HBS Case [9-695-026]

“Design for Manufacturability at Midwest Industries,” HBS case study.
“Benefits and Limitations of Structured Methodologies in Product Design.
“Control Tomorrow’s Costs Through Today’s Designs.” HBR. [96104]

“Demographics or dartboards?” San Jose Mercury News. September 11, 1996.
“Note on Listening to the Customer: Part I”

“Note on Listening to the Customer: Part II”. pp. 1-7.
“Spark Innovation Through Empathic Design.” HBR. [97606]

“Disruptive Technologies Catching the Wave.” Harvard Business Review. [95103]
“Entrepreneur Sam Farber on Design”

“The Predictive Power of Internet-Based Product Concept Testing Using Visual Depiction and Animation”
Optional reading: “The Virtual Customer”


“Team New Zealand (A),” HBS Case [9-697-040]
“Comments on the Second Toyota Paradox” [9-602-035]
Contents of the course reader (continued)

“Innovation at 3M Corporation (A).” HBS Case [9-699-012]
“Why No One Really Wants Creativity.” Creative Action in Organizations.
“Time to Listen to the Kinky Guys.” Automotive Industries. September, 1996.
Module 1: THE PRODUCT DEVELOPMENT PROCESS

Session 1
Monday, March 31, 2003

Introduction to New Product Development

We study the connections between product design, development, and manufacturing. These ideas are related to customer satisfaction, product cost, and manufacturing efficiency. Our goal is to show how advanced planning can improve products, processes and profits.

Readings (35 pages)

Course Outline (this document)
Case: “SweetWater.” HBS Case [9-695-026]

Assignment: Consider the following study questions for class discussion:

• What steps will Sandy Platter need to take in order to be successful? How would you proceed with these steps?
• How are the functions of product design and manufacturing connected? Is this important in terms of customer satisfaction? Time-to Market? Profits?
• What should drive product decisions made by firms? What does drive them?
• What role do suppliers and distributors play in determining product design?
• How much should Sandy charge for his product?
• What challenges did Polaroid face in developing PopShots?
• What would you have done if you were in Herchen’s position?
• What characterizes a successful new product development process?
• How can firms improve new product development?

Turn in a list of your team members
and a short project description
by Friday, April 4, 2003.
Drop off at Professor Dahan’s mailbox in B 4.12
and email to edahan@ucla.edu
Module II: Voice of the Manufacturer (Product Cost)

Session 2  Monday, April 7, 2003

Design for Manufacturability (DFM) / Target Costs

Decisions regarding product design must consider the specific capabilities of the manufacturing plant in which the product will ultimately be produced. A somewhat structured methodology, known as Design for Manufacturability (DFM), has been developed for this purpose.

DFM implementation will be discussed through analysis of a case study. An integral part of DFM is estimating product costs for alternate designs and configurations. We study how low cost can be designed into a product and the changing nature of manufacturing costs.

Readings:
“Design for Manufacturability at Midwest Industries,” HBS case study.
“Control Tomorrow’s Costs Through Today’s Designs.” HBR. [96104]

Read the case and articles and think about the following questions:
• How should design guidelines be used? Who should be on DFX teams?
• Why is product cost so important to firms like Toyota?
• Should a marketing manager care about cost?
• What determines the cost of each part in a product? What should determine it?
• How should target costs be set?
• What information would be most useful when setting them?
• How do DFM and Target Costing relate?
• Identify some characteristics of an organizational structure and culture that promotes the implementation of DFM.
• For those of you with industrial experience, how is DFM implemented in the organizations in which you work (or have worked)?
• Do you concur with the concept that “Quality is free?”

Team Homework Assignment:

Your team should turn in a list of “things done right” and “things done wrong” by Midwest in implementing DFM at each of the 3 sites to date. (Two pages maximum, 2 by 3 table)
Module III: LISTENING TO CUSTOMERS

Session 3  Monday, April 11, 2003
Conjoint Analysis

Products can be described as a bundle of attributes such as price, function, aesthetics, etc. Conjoint analysis allows individual customers to indicate the degree to which each attribute matters to them.

Readings (15 pages)
Waxman, Sharon. “Demographics or dartboards?” San Jose Mercury News.

Assignment:
Turn in the conjoint analysis homework assignment (handed out in a prior class).

Prepare the following study questions for class discussion:
• Who is a customer? How do we divide customers into market segments?
• How would you develop the 108 movie descriptions Ms. Waxman refers to?
• What are the primary benefits of conjoint analysis?
• What kind of attributes should be evaluated? Which should not? Why?
• How should a product’s price be set given conjoint data?
• How does a product’s cost enter the picture?

Keys: Conjoint Analysis, Fractional Factorial Design, Product Attributes, Utility

Session 4  Monday, April 14, 2003
Listening to the Customer

Capturing the “voice-of-the-customer” is critical to meeting customer needs and wants, but it is quite a challenge. We will study conjoint analysis further and compare it with other ways of listening to customers, including Zmet, surveys, focus groups and “troupes,” QFD, cultural anthropology, empathic design, etc.

Readings (32 pages)
“Spark Innovation Through Empathic Design.” HBR. [97606]
Lieber, Ronald B. “Storytelling: ... Get close to Your Customer.” Fortune.

Assignment: Prepare the following study questions for class discussion:
• Why is the customer’s voice important? What do we listen customers?
• What makes Zaltman’s storytelling technique work? When is it appropriate?
• When is the customer’s voice misleading?
• How do the different types of customer needs raised by Kano and others affect product design? Marketing? Manufacturing

Keys: Site visits, Surveys, Focus Groups, Benefit Chains, QFD
Session 5
Monday, April 21, 2003
Creating Value & Disruptive Technologies

After the tradeoffs between customer needs and firm capabilities have been made, detailed design of parts and processes soon follow. This session is devoted to the process of allocating cost to components of the final product. We consider the notion of product concept testing.

Readings (38 pages)
“Disruptive Technologies Catching the Wave.” Harvard Business Review. [95103]
“Entrepreneur Sam Farber on Design”

Assignment:
Prepare the following study questions for class discussion:
• How do you test whether your design is good or not? When do you know?
• Why should firms sometimes ignore their customer?
• What, exactly, should be ignored? What should not be ignored?
• Have other industries followed the same path as the disk drive industry?
• How would you solve the problem of disruptive threats?

Keys: Value Analysis, QFD, Kano, Kansei, User Observation, Cultural Anthropology, Benefit Chains, Disruptive Technologies
Session 6
Monday, April 28, 2003
Concept Selection & Web-based Market Research

Once the customer’s voice has been captured, many product and process decisions need to be made. The choice of a particular product concept requires objective methods of comparing the alternatives and selecting the “best.” We will discuss several web-based market research experiments that help in the process of concept selection.

Readings: (39 pages)


Assignment:
Prepare the following study questions for class discussion:

• How can the Web-based methods described be integrated into the NPD process?

• What are the pros and cons of Web-based NPD research?

• Under what conditions does Pugh’s technique make sense to you? What organizational/political issues does Pugh’s method raise?

• How has your team sorted out competing concepts?

Homework:
Individual assignment: Email one or more GREAT exam question(s), in PowerPoint format to edahan@ucla.edu by 5pm on Thursday, May 1, 2003

Keys: Virtual Customer, Cross-Functional Teams, Pugh Concept Selection, TRIZ
Session 7  
Monday, May 5, 2003  
Demand, Segmentation, Pricing Versioning & Mass Customization

Previous sessions have covered techniques that enable a product design to be tailored to customer needs. We now explore the boundary between product design and manufacturing. Intuition regarding the behavior of manufacturing systems will be developed. We will also uncover lessons for the product developer that promote greater manufacturing system performance. We will explore the concept of flexibility, how to quantify it, and how to speed up design and manufacturing. These topics will feed into a discussion of market segmentation and pricing, including the concept of versioning.

Readings: (18 pages)  

Assignment: Please prepare these questions for class discussion.
- Why is product variety increasing?
- How has HP benefited from mass customization?
- How do Gilmore and Pine’s ideas relate to the internet?
- At what point in the design process should mass customization be considered? How does it affect the new product development process?
- How do you define flexibility? When is flexibility needed?
- How does direct distribution affect Dell’s product design and development? What are the advantages and disadvantages of Dell Direct distribution?
- Which segmentation approaches are meaningful in high technology markets?
- How does Versioning relate to the 4 P’s: Price, Product, Promotion and Place?
Module IV: PROTOTYPING & TESTING

Session 8  Monday, May 12, 2003

EXAMINATION (Exam starts exactly at 9:00am)

EXAMINATION (80 MINUTES) 9:00am – 10:20am

Parallel Prototyping
Even after listening to customers and planning the design, cost, and engineering of a new product, some uncertainty about its future success remains. Prototyping new designs in physical and virtual ways reduces the uncertainty and improve results. Parallel prototyping, can produce even better results, but may pose challenges.

We will discuss prototyping as a tool for resolving market and technical uncertainty in new product development, and in particular look at the notion of carrying multiple design options forward through set-based design and parallel or sequential prototyping.

Readings (28 pages):
Case: “Team New Zealand (A)” HBS Case [9-697-040]
Note: “Comments on the Second Toyota Paradox” [9-602-035]

Assignment:
Prepare the following study questions for class discussion:

• What do you think? Team New Zealand should build:
  [ ] Two similar boats now
  [ ] Two different boats now
  [ ] One boat now, one boat later

• How would you evaluate Team New Zealand’s use of simulation in the design process? What are its advantages and disadvantages?

• What role does CAD play in prototyping? What effect will lower CAD and simulation costs have on new product development?

• Why is Toyota developing more prototypes than its competitors?

• What advantages does Toyota’s approach generate in NPD?

• What are the pros and cons of platforms?

Homework:
Please turn in your Team Project report and Parallel & Sequential Prototyping homework assignment
Session 9  Monday, May 19, 2003
Creativity, Lead Users & Design

Reading (41 pages)

Case: “Innovation at 3M Corporation (A)” HBS Case [9-699-012]
Staw, Barry M. “Why No One Really Wants Creativity.” Creative Action in Organizations. pp. 161-166

Assignment: Prepare the following study questions for class discussion:

• How has 3M’s innovation process evolved since the firm’s founding?
• What characterizes an ideal lead user? How does the Lead User method compare with other market research methods?
• Has the Medical-Surgical team applied Lead User research appropriately?
• What should the Medical-Surgical team recommend to Dunlop: the three new product concepts or a new business strategy?
• How would you manage the trash can designers if they worked for you?
• Do firms need to take the risks inherent in “kinky” creativity? If so, why?
• How can you identify people with the ability to be creative?
• How can you create the proper environment for them to be productive?
• Where should new product ideas come from? Where do they come from?
• How could you implement scenario planning for your team’s project?
• What role does industrial design play in a product’s success?

Keys: Lead users, creativity, ideation, out-of-the-box thinking, product concepts, scenario planning

Have a Wonderful Summer!