

266A-02: New Product Development – Prof. E. Dahan

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266A-02 (FEMBA) Wednesdays 4:00pm – 6:50pm, room B3.01	
Session Summary	Assignment Due
1 October 5, 2005 <i>Sweetwater</i> case, KJ Analysis Conjoint analysis, listening to customers Introduction of class projects	Due Friday 10/7/05: <ul style="list-style-type: none"> • Team list • Conjoint homework • Conjoint survey
2 October 12, 2005 <i>3M Lead Users</i> case Listening to lead users and creative types	<ul style="list-style-type: none"> • 5-10 concepts/ sketches/ ideas (by 10/14/05)
3 October 19, 2005 Why cost matters: <i>The Profit Saddle</i> The China Price	
4 October 26, 2005 Guest: Stuart Munson, Microsoft <i>Segway LLC</i> case, Concept Selection, TRIZ, Creating Value, Process of Elimination	
5 November 2, 2005 Mass Customization, Made-To-Order Strategies Demand models & Pricing	
6 November 9, 2005 <i>The Virtual Customer</i> Web-based Research, Intro to parallel prototyping	
7 November 16, 2005 Guest: John Chisholm, CEO, CustomerSat, Inc. <i>Merck</i> case Parallel prototyping Set-based design	<ul style="list-style-type: none"> • Parallel & Seq. Prototyping Homework (by 11/16/05)
8 November 23, 2005 Winning with New Products Disruptive Technologies	<ul style="list-style-type: none"> • Exam Question in PowerPoint (by 11/21/05) • <i>Happy Thanksgiving</i>
9 November 30, 2005 <i>Team New Zealand</i> case EXAM IN B-301 AND B-313	<ul style="list-style-type: none"> • Project PowerPoint due 11/30 • Study for EXAM
10 December 7, 2005 PRODUCT PRESENTATION EVENT AND EXERCISES	<ul style="list-style-type: none"> • Final Project Report due 12/7 <i>Enjoy Your Winter Break!</i>

(updates shown in red)

266A Course Syllabus
New Product Development

October 5 to December 7, 2005 • 10 Weeks
Fall Quarter 2005, Wednesdays, 4:00pm-6:50pm
Section 2 (FEMBA): Room B3.01

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GRADING

- | | |
|---------------------------------------|-----|
| 1. Written Assignments: | 25% |
| 2. Examination: | 30% |
| 3. Project: | 25% |
| 4. Contributions to class discussion: | 20% |

In general, we are required to follow the final grade distribution policy set by the MBA and FEMBA programs, which allows fewer than 20% A's and A+'s, 50% or fewer A's of all types, and at least 5% B-'s and below.

COURSE “RULES”

- **PC's/PDA's/Phones:** place PC's, phones, PDA's under desk (and off) during class.
- **Mandatory attendance:** attend every session. Do not schedule travel, interviews, or conflicts.
- **Assignment deadlines:** Submit assignments on time to count for your grade.
- **Enrolling in 266A:** ONLY students who bid for 266A may be added to the class at this point.

WRITTEN ASSIGNMENTS

- **Due Friday, October 7:** 1) Team list for the course project report and presentations
2) Conjoint homework worksheet to be completed alone,
3) Conjoint survey responses at: www.webconjoint.com
- **Due Friday, October 14:** Team PowerPoint of 5-10 project concepts/ideas
- **Due Wed., November 16:** Individual Parallel & Sequential Prototyping worksheet
- **Due Monday, November 21:** Great Exam Question in PowerPoint from each student
- **Due Wed., November 30:** Team project PowerPoint
- **Due Wed., December 7:** Team project final report & project presentations in class
- **Additional short assignments and in-class presentations** may be assigned

EXAMINATION

There will be a short answer and/or multiple-choice, in-class exam on Wednesday, November 30. Doing the readings and attending all sessions will provide an advantage.

PROJECT

Objective: The project provides an opportunity for in-depth study or application of the techniques or concepts discussed in class. It should be done in groups of four to six. All teams will design, refine and prototype a simple product, such as a “smart” cell phone.

Deliverables: Project concepts & idea will be due relatively early in the quarter, followed by a PowerPoint file, final report, and in-class presentation. Specifically:

Friday, Oct. 7, 2005: Team list / conjoint survey at www.webconjoint.com.

Friday, Oct. 14, 2005: 5-10 concepts/ideas/sketches in PowerPoint.

Wed. Nov. 30, 2005: Team PowerPoints are due, 5-10 min. presentation of **key results**.

Wed. Dec. 7, 2005: Written project reports are due.

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 discussion questions. You may be “cold-called.” In order to receive participation credit for a missed class, submit a two page summary of the session missed by the beginning of the following class. Do not miss more than one of the ten sessions. Absences will affect your grade adversely. Quantity and quality of participation are both important. The grading formula will be along the following lines:

$CDG = \sqrt{Qty \times Avg.Score} - Absence Penalty$, where *CDG* is the class discussion grade, *Qty* is the number of significant contributions, and *Avg. Score* is the average quality of your contributions. *If you find it difficult to participate, please discuss this with Professor Dahan.*

Contents of the course reader

Getting Ahead: We will read Nalebuff and Ayres' 2004 book, *Why Not? How to Use Everyday Ingenuity to Solve Problems Big and Small*, throughout the quarter. It's a good idea to read it before the quarter begins as a way of getting a head start, and getting your head started.

1

Case: "SweetWater." HBS Case [9-695-026]

Note: "Conjoint Analysis: A Manager's Guide." HBS Note [9-590-059]

Dahan, Ely, "Note on Listening to the Customer: Part I". pp. 1-17.

Ulrich, Karl, "KJ Diagrams". pp. 1-10.

2

Case: "Innovation at 3M Corporation (A)." HBS Case [9-699-012]

"Spark Innovation Through Empathic Design." HBR. [97606]

"Storytelling: ... Get close to Your Customer." *Fortune*.

"Playacting and Focus Troupes," *Interactions*. Sept./Oct. 1999, pp. 35-41.

"Note on Listening to the Customer: Part II". pp. 1-5.

"Why No One Really Wants Creativity." *Creative Action in Organizations*. pp. 161-166

3

"The China Price," *BusinessWeek*. pp. 102-112.

"The Profit Saddle," pp. 1-12.

"Control Tomorrow's Costs Through Today's Designs." HBR. [96104]

"Introduction," from *Product Design for Manufacture and Assembly*

"Benefits and Limitations of Structured Methodologies in Product Design"

4

Case: "Segway LLC." *Wharton case*, pp. 1-17.

"Surviving the Process of Elimination," pp. 1-7.

"A Higher Plane of Problem Solving," *Business 2.0*, June 2003, pp. 54-56.

"Entrepreneur Sam Farber on Design" @issue (Corporate Design Foundation).

5

"The Four Faces of Mass Customization." *Harvard Business Review*. Jan-Feb, '97.

"Offshoring Versus 'Spackling'," *MIT Sloan Management Review*, Spring 2005, pp. 6-7.

6

"The Virtual Customer"

7

CASE: "New Drug Development at Merck & Co." *Wharton case*. pp. 1-16.

"Feeding the pipeline," *BusinessWeek*. 5/12/03. pp. 78-82.

"Toyota's Principles of Set-Based Concurrent Engineering" *SMR*, Winter 1999.

8

"What America Must Do To Compete With China and India" *BusinessWeek*, 12 pages.

"Doing It Right: Winning with New Products." *Stage-Gate, Inc.* pp. 1-10.

"Disruptive Technologies Catching the Wave." *Harvard Business Review*. [95103]

"Danger: Stealth attack." *Forbes*. 1/25/99. pp. 88-93.

"Ignore Your Customer". *Fortune*. May 1, 1995. pp. 121-126.

9

"Team New Zealand (A)." HBS Case [9-697-040]

Other Useful References (from A to Z) on Creativity and Innovation

Adams, James, *Conceptual Blockbusting: A Guide to Better Ideas*

Amabile, Teresa, D. Leonard & J. Rayport, *Harvard Business Review on Breakthrough Thinking*

Csikszentmihalyi, Mihaly, *Creativity: Flow and the Psychology of Discovery and Invention*

De Bono, Edward, *Lateral Thinking: Creativity Step by Step*

De Bono, Edward, *Six Thinking Hats*

De Bono, Edward, *The 5-Day Course in Thinking*

Feinstein, Jonathan S., *The Nature of Creative Development*

Hamel, Gary, *Leading the Revolution*

Kelly, Tom and Jonathan Littman, *The Art of Innovation: Lessons in Creativity from Ideo*

Michalko, Michael, *Tinkertoys*

Sutton, R., *Weird Ideas That Work: 11½ Practices for Promoting, Managing, & Sustaining Innovation*

von Hippel, Eric, *Democratizing Innovation*

Weisberg, Robert W., *Creativity: Beyond the Myth of Genius*

Zeitzi, Paul, *The Art and Craft of Problem Solving* (more mathematical)

Other Useful References for Quantitative Marketing

Aaker, Kumar & Day (2004). *Marketing Research*, 8th Edition. New York: Wiley.

Armstrong, J. Scott (2001). *Principles of Forecasting*. Boston: Kluwer Academic Publishers.

Blattberg, Thomas & Getz (2001). *Customer Equity*. Boston: Harvard Business School Press.

Brandenburger & Nalebuff (1996). *Co-opetition*. New York: Doubleday.

Dolan & Simon (1996). *Power Pricing*. New York: The Free Press.

Doyle (2000). *Value-Based Marketing*. New York: Wiley.

Kotler (2003). *Marketing Management: Analysis, Planning, Implementation & Control*, Prentice-Hall.

Mahajan, Muller & Wind (Eds.) (2001). *New-Product Diffusion Models*. Boston: Kluwer.

Rao & Steckel (1998). *Analysis for Strategic Marketing*. Reading, MA: Addison-Wesley.

Rust, Zeithaml & Lemon (2000). *Driving Customer Equity*. New York: The Free Press.

Sudharshan (1995). *Marketing Strategy: Relationships, Offerings, Timing & Resource Allocation*.

Tellis, Gerard J. (2004). *Effective Advertising: Understanding When, How, and Why....* Sage.

Urban & Hauser (1993). *Design and Marketing of New Products, 2nd Edition*. Prentice-Hall.

Urban & Star (1991). *Advanced Marketing Strategy*. Englewood Cliffs, NJ: Prentice-Hall.

Session 1

Wednesday, October 5, 2005

Listening to Customers with Conjoint Analysis

We'll look at a fun case of a new product being designed, then learn how to quantify some of the issues raised. 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. We'll also introduce the course project.

Readings (115 pages):

Case: "SweetWater." HBS Case [9-695-026], pp. 1-9.

Course Outline (*this document*), pp. 1-14.

Note: "Conjoint Analysis: A Manager's Guide." HBS Note [9-590-059] , pp. 1-14.

Dahan, Ely, "Note on Listening to the Customer: Part I". pp. 1-15.

Ulrich, Karl, "KJ Diagrams". pp. 1-10.

Why Not? book: Preface and pp. 1 – 63

(3) Three Assignments:

Due Friday 10/7/05, please submit:

- (1) a list of your project team members, by emailing to edahan@ucla.edu
- (2) Submit the (individual) conjoint analysis problem worksheet to Mark Dalby
- (3) Submit your personal *SmartPhone* survey responses at: www.webconjoint.com

Prepare the following study questions for class discussion:

- What steps will Sandy Platter need to take in order to be successful?
- How much should Sandy charge for his product?
- Who is a customer? How do we divide customers into market segments?
- How many units would Platter need to sell to make a living at this?
- How might KJ Analysis help prepare for conjoint analysis?
- 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 functions, KJ Analysis

Session 2 Wednesday, October 12, 2005

Listening to Lead Users and Creative Types

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 lead user analysis, Zmet, focus “troupes,” cultural anthropology, empathic design, etc. Then we will turn to the topic of creativity.

Readings (87 pages):

- CASE: “Innovation at 3M Corporation (A).” *HBS Case* [9-699-012], pp. 1-23.
“Spark Innovation Through Empathic Design.” *HBR*. [97606], pp. 102-113.
Lieber, Ronald B. “Storytelling: ... Get close to Your Customer.” *Fortune*. pp. 102-107.
Dahan, Ely, “Note on Listening to the Customer: Part II”. pp. 1-5.
Sato, Steve and Tony Salvador, “Playacting and Focus Troupes,” *Interactions*, Sep/Oct 1999, pp. 35-41.
Staw, Barry M. “Why No One Really Wants Creativity.” *Creative Action in Organizations*. pp. 161-166

Why Not? book: pp. 87 – 114

Assignment: Prepare the following study questions for class discussion:

Due Friday 10/14/05: As your homework assignment, please submit:
5-10 concepts/sketches/ideas (preferably in PowerPoint) for the project,
by emailing your team’s PowerPoint file to edahan@ucla.edu

- How has 3M’s innovation process evolved since the firm’s founding?
- What characterizes ideal lead users?
- How is the lead user method different from empathic design?
- Has the Medical-Surgical team applied Lead User research appropriately?
- What should the Medical-Surgical team recommend to Dunlop?
- How does empathic (not *emphatic!*) design differ from the lead user method?
- What makes Zaltman’s storytelling technique work? When is it appropriate?
- How can you: identify creative people? Create the proper environment for them?
- Where should new product ideas come from? Where do they come from?
- How could you implement focus troupes for your team’s project?
- Why is the customer’s voice important? Why do we listen to customers?
- How do the different types of customer needs raised by Kano and others affect product design? Marketing? Manufacturing

Keys: Lead users, creativity, ideation, out-of-the-box thinking, product concepts, scenario planning Surveys, Focus Groups, Benefit Chains, QFD, Kano, Kansei, User Observation, Cultural Anthropology

Session 3 Wednesday, October 19, 2005

The China Price / Target Costs / Design for Manufacturability (DFM)

Most marketers and NPD teams don't focus on cost reduction until relatively late in the game (i.e., until after the product concept has pretty much been determined). Is this wise?

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.

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. The impact of China's manufacturing prowess will be discussed.

Readings (33 pages):

"The China Price," *BusinessWeek*. pp. 102-112.

"*The Profit Saddle*," by Dahan and Srinivasan, pp. 1-12.

"Control Tomorrow's Costs Through Today's Designs." *HBR*. 10p. [96104]

Optional: Chapter 1, "Introduction," from *Product Design for Manufacture and Assembly*, Boothroyd, Geoffrey, et. al. 1991. pp.1-18 plus 2-page appendix.

Optional: Barkan, Philip and Martin Hinckley. "Benefits and Limitations of Structured Methodologies in Product Design." pp.163-177.

Read the case and articles and think about the following questions:

- How does China achieve its low costs? How should US firms respond?
- Why is product cost so closely watched at firms like Toyota?
- Should a marketing manager care about cost?
- What are the implications of the *Profit Saddle*?
- 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?"

Session 4

October 26, 2005

Guest: *Stuart Munson, Microsoft*

Stuart Munson leads the market research efforts for the Microsoft Corporation in the PocketPC and SmartPhone areas. This session should provide an invaluable opportunity to learn about software, killer apps, and the direction of the smart phone product category.

Creating Value, TRIZ, Concept Selection

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.

Readings (63 pages)

CASE: "Segway LLC." *Wharton case*, pp. 1-17.

"Surviving the Process of Elimination", 2005, pp. 1-7.

"A Higher Plane of Problem Solving," *Business 2.0*, June 2003, pp. 54-56.

"Entrepreneur Sam Farber on Design" *@issue* (Corporate Design Foundation).

Why Not? book: pp. 135-156

Assignment questions for class discussion:

- **Think of key questions you would like to address to Stuart Munson**
- Based on what you know about Segway, what did the team do well in developing the Segway Human Transporter?
- What concerns do you have about the development process?
- What do you think of Steve Jobs assertion that "The question isn't whether people will buy it. The question is whether the government will let them use it?"
- How would you forecast demand for the Segway HT?
- How do you answer Aileen Lee's question "What is the benefit proposition?"
- What role does industrial design play in a product's success?
- How do you test whether your design is good or not? When do you know?
- What determines the cost of each part in a product? What *should* determine it?
- How would you manage these designers if they worked for you?
- What organizational/political issues does Pugh's concept method raise?

Keys: Pugh Concept Selection, Design for Value, Value Analysis, TRIZ

Session 5

Wednesday, November 2, 2005

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. We will explore the concept of flexibility, how to quantify it, and when to consider mass customization. These topics will feed into a discussion of market segmentation and pricing.

Readings (24 pages)

Gilmore, James H. and Joseph Pine II. "The Four Faces of Mass Customization."

Harvard Business Review. January-February, 1997. pp. 91-101.

Cattani, Kyle, Ely Dahan and Glen Schmidt, "Offshoring Versus 'Spackling'," *MIT Sloan Management Review*, Spring 2005, pp. 6-7.

Why Not? book: pp. 201 – 214

Assignment: Please prepare these questions for class discussion.

- How do each of the following affect a firm's decision on whether to produce goods on a make-to-order basis?
 - Cost** increases due to last-minute production
 - Uniqueness** (heterogeneity) of customer preferences
 - Spoilage** rate of inventory
 - Time-sensitivity** of customers about waiting for delivery
- Why is product variety rising? How do firms benefit from mass customization?
- How do Gilmore and Pine's ideas relate to the internet?
- When in the design process should mass customization be considered?
- How should mass-customized goods be priced?
- How might "spackling" help US firms compete against lower-cost competitors?
- For which aspects of your team's project might a make-to-order strategy apply?

Session 6

Wednesday, November 9, 2005

Concept Testing & 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. We will also begin exploring the notion of parallel testing.

Readings: (22 pages)

Dahan, Ely and John R. Hauser, "The Virtual Customer," *Journal of Product Innovation Management*, September, 2002, pp. 332-353.

Assignment:

Prepare the following study questions for class discussion:

- How can Web-based methods be integrated into the NPD process?
- What are the pros and cons of Web-based NPD research?
- How has your team sorted out competing concepts?
- How would you define a winning product idea?

Keys: Concept Testing, Virtual Customer, Winning product ideas

Session 7

Wednesday, November 16, 2005

Guest: John Chisholm, CEO of CustomerSat, Inc. (<http://www.customersat.com/>)

Parallel Prototyping

After listening to customers refining design & cost, some uncertainty about its future success remains. Prototyping new designs may reduce uncertainty and improve results. Parallel prototyping can produce even faster results, but poses 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: (38 pages)

VISIT <http://www.customersat.com/> and look at solutions offered

CASE: New Drug Development at Merck & Co. *Wharton case*. pp. 1-16.

Barrett, Amy, et. al. "Feeding the pipeline," *BusinessWeek*. 5/12/03. pp. 78-82.

Optional: Sobek, D.K., A.C. Ward, and J.K. Liker. "Toyota's Principles of Set-Based Concurrent Engineering" *Sloan Management Review*, Winter 1999. pp. 67-83.

Assignment: Please prepare these questions for class discussion.

- **Think of questions you would to address to John Chisholm**
- How should Merck allocate its preclinical development slots to new compounds?
- Should Merck release fewer than 20 compounds to preclinical development?
- What are the various risks associated with operating the development pipeline?
- What are possible strategies to mitigate these risks?
- How can Merck enrich the medical views of the scientists with financial tools?
- How do pharmaceutical firms deal with uncertainty?
- Why is Toyota developing more prototypes than its competitors?
- What advantages does Toyota's approach generate in NPD?

Homework:

Due 11/16/05: Parallel & Sequential Prototyping homework assignment

Session 8 Wednesday, November 23, 2005

New Product Development Processes & Disruptive Technologies

To motivate our emphasis on innovation, creativity, and cost reduction, we will consider the competitive positioning of Chinese and Indian firms relative to American ones.

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. We strive to synthesize our past learnings about cost reduction, creativity, testing, and whether we should listen to customer input.

Readings (63 pages)

“What America Must Do To Compete With China and India,” *BusinessWeek*, August 22, 2005, 12 pages (pp. 144, 134-36, 64-66, 112-117).

Cooper, R. G., “Doing It Right: Winning with New Products.” *Stage-Gate, Inc.* pp. 1-10.

“Disruptive Technologies Catching the Wave.” *Harvard Business Review*. [95103], 11p.

Mack, Toni and Mary Summers. “Danger: Stealth attack.” *Forbes*. 1/25/99. pp. 88-93.

Martin, Justin, “Ignore Your Customer”. *Fortune*. May 1, 1995. pp. 121-126.

Why Not? book: pp. 115 – 132

Assignment: Consider the following study questions for class discussion:

- What advantages and disadvantages do China and India possess?
- How should US firms respond to competition from China and India?
- What *should* drive product decisions made by firms? What *does* drive them?
- What characterizes a successful new product development process?
- How can firms improve new product development?
- When do customers mislead? Why should firms sometimes ignore their customer?
- What, exactly, should be ignored? What should *not* be ignored?
- How would you address the problem of disruptive threats?

Homework:

Due 11/21: Individual assignment: Email one or more GREAT exam question(s), in PowerPoint format to edahan@ucla.edu by noon, Monday, November 21
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Happy Thanksgiving Day Holiday!

Session 9 Wednesday, November 30, 2005

Team New Zealand Case and EXAM

We discuss a case illustrating optimal experimentation under time pressure. The key idea is that multiple tests allow us to optimize the incremental gains versus the incremental costs, in expectation, due to testing.

Readings (14 pages):

CASE: "Team New Zealand (A)." *HBS Case* [9-697-040]

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
- Can you quantify the expected seconds of improvement from each?
(Hint: Consider how much improvement is gained by each type of test, the probabilities of realizing those improvements, and the number of tries you will have time for in the remaining two months.)
- 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?

Homework:

Due 11/30/05: Please turn in your Team Project PowerPoint

EXAMINATION (*Exam starts at the 1:20 hour mark of the class, at 5:20pm*)

EXAMINATION TODAY (80 MINUTES) IN B-301 AND B-313

Session 10 Wednesday, December 7, 2005

Team Product Presentations

After course evaluations are completed, each team will present its product recommendations and process breakthroughs in a brief PowerPoint format (5 slides maximum) and the class votes for the winning product. If time allows, a stock market simulation game will also be used to evaluate product ideas.

Due 12/7/05: Please turn in your Team Project final report

***Have a wonderful holiday break,
and good job-hunting!***