Graduate School of Management
Department of Marketing
University of California - Davis

MGT 241: New Product Development
Winter 2014

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Course Objectives

Each year, in the US, approximately 30,000 new consumer products (i.e. CPG products) are launched. About 95% of them are failures (see Carmen Nobel (2011), *Clayton Christensen's Milkshake Marketing*). For other product categories the failure rate ranges from 40%-60%. Why is this so? Even though firms have a long history of bringing new products to the market, why do a majority of them fail? As evident from this fact, bringing a new product to market is fraught with uncertainty, and the odds are stacked against you (quite heavily!). While no course can ensure success for every new product introduction you might make, this course will help you think of ways to reduce the possibility of failure – i.e., we will study the challenges of bringing new products to market, and discuss avenues to possibly overcome them. The topics discussed are relevant whether you work for a startup or Fortune 500 firm or whether your firm focuses on the B2B or B2C space. The course focuses on state of the art frameworks, concepts and tools that have been recently validated by innovative companies. We will structure our learning around the following basic steps of the innovation process: Opportunity identification, Idea generation, Product design, Concept testing and Launch strategies. As part of this course you will also learn to deal with multiple entities that speak 'different languages,' helping you develop the ability to communicate ideas to the different constituencies involved in the product development process – i.e., you will be the mediator between the customer and the engineer. More information about the course follows.

Prerequisites and Course Information

Marketing Management (MGT/P/B 204)

To derive the full benefit of this course, it is *recommended* that you have taken or are currently enrolled in *at least* one of the following four courses: Marketing Strategies (MGT/P/B 248); Marketing Research (MGT/P/B 249); Pricing (MGT/P/B 234); Digital Marketing (MGT/P/B 293). I will assume that you have prior knowledge of pricing and market research techniques.

Class Rules

Academic Honor Code

There are two individual level assignments in this course. You are expected to complete the assignments on your own, without help from your peers – i.e., you are not permitted to work with others *on any aspect* of the individually graded coursework. In case you have questions regarding the material or assignments, I'm available either in my office, by phone or email and will be happy to answer your questions.

Use of Electronics in Class

You are allowed to use your laptop/tablet in class – however this use is conditional. You cannot use your laptops for any other activities other than those pertaining to the class. Hence, surfing, emailing, chatting, Facebook visits and other related activities are not allowed. Smartphone/phone use is not allowed in class – you are welcome to step out of class, with my permission, if you need to answer a call.

Required Course Material

New Product Development TextPak, which consists of articles used in the lectures.

Course Requirement and Grading

The course requirements and their contribution to the overall grade are as follows:

1. Assignment 1 (HW1)	10%
2. Assignment 2 (HW2)	25%
3. Class Participation	15%
4. Group Project	50% (see below for grade split)
• Project Presentation 1	10%
• Project Presentation 2	10%
• Progress Report 1	15%
• Progress Report 2	15%

Individual Component

Assignments 1&2 (HW1 & HW2)

Each assignment will consist of a case (as specified in the schedule) that will be given to you for your analysis of the issues the case discusses. Assignment questions related to each case will be handed out on the date specified in the course schedule. The due dates for each assignment are also clarified in the course schedule.

Class Participation

Meaningful class interactions enhance the learning experience. Hence, I consider class participation to be an important component of your education in this course. A lot of your learning about ideation and the creativity process will come from intensive class discussions – so, I expect that you have read all the articles assigned to each class *prior to the class* and come prepared to discuss your insights about and analysis of the articles. Additionally, feel free to go above and beyond just the class readings – bring articles that caught your attention, any prior experience you might have had with new product development also into the conversation. Conversations that enrich the class discussion are encouraged; at the same time I will discourage conversations that might veer the class off-track. Simply speaking in class without adding constructively to the class discussion will not merit any points. Finally, while I encourage you to voluntarily participate in the class discussion, also expect to be cold called from time to time.

Group Component

At the beginning of the course I will assign students to groups that work together for the entire period of the course. *Please note that all group work will be subject to a peer assessment at the end.* Individuals who do not contribute their fair share to the group (*as determined by the group*) will be penalized on all their group work. The penalty will be up to a maximum of 1/3rd of the group component of the grade.

Group Project

This group project is meant to capture several aspects of the new product development process. First, it will gauge (and strengthen) your ability to work with teams from a diverse set of backgrounds. Your group will engage with a team (assigned in Class 1) from the Bioengineering school. Students in the Bioengineering school are currently, as part of another course, developing a product to meet the demands of a particular customer. Your group will work with the team from the Bioengineering school on ways to create the product concept. Think of different ways the product can be used– are there other markets with similar needs? Could there be multiple uses for this product? Can minor modifications to the product create new opportunities beyond the current customer profile? Then, while the engineering students work on the technical part of the product development exercise, your group develops a marketing plan and launch strategy for the product.

For the marketing plan, you will carry out various standard market research activities that could include, but are not restricted to, interviewing clients and potential customers, gathering ethnographic data, forming price ranges, estimating market potential, analyzing possible competitors, developing a distribution strategy, and suggesting a promotion strategy for market introduction (is a promotion strategy even required?). If possible, run a preliminary concept test with 'potential customers'. This might not be possible with an actual prototype, but try and judge customer reactions to the concept you develop. All these steps then help you devise a launch strategy for the product.

Finally, apart from accounting for the considerations of your marketing plan in the launch strategy, you must also develop an effective communication plan (message and channel). So your group needs to synthesize and convert the technical advances of the new product being developed into knowledge and benefits easily accessible to the average user of the product.

Remember: *a product is a solution to an existing need of the customer* – sometimes the customer is aware of the need, at other times they are not – it is your job to make this need salient through effective product design, pricing, distribution and communication.

As evident from the above description, this study is self-directed and comprehensive in terms of the different marketing concepts you will need to utilize. There are *4 deliverables* for this project. The *1st deliverable* is a Progress Report #1. The *2nd deliverable* is Presentation #1. The *3rd deliverable* is Progress Report #2. The *4th deliverable* Presentation #2.

All groups will meet with me two times during the quarter (in Week 3 and Week 7). Groups must email me to set up these meetings. Finally, detailed requirements for Progress Report #1 and #2 are listed below. Portions relevant to MBA students are highlighted in each report's description.

Progress Report #1:
Due on 2/3

The focus of this report is on your problem formulation, client needs assessment, and development of your preliminary engineering design specifications (EDS) which serve as input to your design process. If collaborating with the MBA students, you will also include a competitive analysis and develop a customer-based innovation model. This will be a **joint report** with Engineering.

Grading:

Point deductions of up to 10% may be expected for work that does not communicate information effectively, is sloppy, unorganized, or not checked for spelling and grammar.
Please submit as a single pdf and limit the main text to 12 pages.

Progress reports are meant to be detailed, though you are encouraged to be clear and concise in the text and make good use of figures, tables and appendices. While it is good that figures and tables stand alone, don't assume that they will--i.e. highlight important points or summarize in the text. Provide sufficient background material and detail so that an engineer/designer unfamiliar with your project might

understand your motivations. The report should also be neat, organized and checked for grammar and spelling. It should include the following items:

1. Problem formulation/ objective(s).

Include sufficient background material to allow someone unfamiliar with your project to understand the problem and your motivations--e.g. describe a particular disease state or surgical technique, the current limitations, the end users, environment, etc. This section must include a clear, concise and explicit *statement summarizing the problem and objective(s)*.

2. Client needs assessment.

Include as an appendix a *survey or list of interview questions* that you have generated to aid you in this process. Include a table or list in the text. Include some indication of prioritization or weighting. Consult lecture notes for examples.

3. Assessment of the "state-of-the-art" relevant to your project.

A major goal of this section is to understand the *intellectual property space* related to your project. This section should minimally include the results of a patent search (e.g. through the *U.S. Patent and Trademark Office* or other search engines such as *freepatentsonline.com*), but might also include key research articles, etc. If there appears to be nothing out there that is a direct match to your project you must get creative with your searching. There will undoubtedly be similar or related technologies that are relevant and could potentially influence your design.

A second goal of this search is to provide *benchmarking data* (i.e. performance metrics for existing competitive products or industry standards that may influence your choices for #4 below). It may be useful to include results from the competitive analysis here (see below).

A third goal for this section is to gather information related to the *performance of existing medical devices* that might influence your design choices. Include the results of a search of the *FDA* databases that log adverse events and recalls associated with medical devices for related devices, and determine the reasons for any failures or recalls. Also search for any white papers or guidance documents that might be particularly relevant to your project (e.g. several recent projects have used a FDA draft guidance document for Mobile Medical Applications).

The FDA maintains the following databases:
Device Listing: devices in commercial distribution
MAUDE: manufacturer and user facility device experience-- reports adverse events
MDR: medical device reporting--death, injury or malfunctions through 1996
Recalls of Medical Devices

This section should summarize your search strategy and findings.

4. Development of engineering metrics, preliminary EDS (targets) and constraints.

The final result here should be a table or listing of your preliminary EDS that serve as input to your design process. These should flow logically from the client needs assessment and reflect the benchmarking data acquired in #3. Consult lecture notes for examples.

Additional Deliverables for MBA team members (graded by Dr. Aravindakshan):

A. Preliminary Competitive Analysis

This will help you assess the level of competition in the market, identify potential threats and recognize weaknesses in your competitors' products.

B. Customer Based Innovation Model

The aim here is to incorporate insights from patients/clients into the product design by observing how people use the proposed product. Remember that people are very good at identifying the problem they wish solved, but rarely good at proposing a solution. So it is expected that you will incorporate aspects of individual behavior into the design process. Start by listening to them, identifying the 'pain points' and articulating the outcomes expected from the new product design. Once you articulate these outcomes, obtain their importance ratings so that the most beneficial attributes of the product can be identified and included in your product design. This will be further augmented by creating customer-job maps to 'put-on-paper' how customers currently use the product. This process should also help you recognize potential improvements to the product design. This will be elaborated on in lecture #2 of your New Product Development class. The insights gained here will directly enhance your contributions to points 1 and 2.

Progress Report #2:
Due on 3/3

The focus of this report is on the presentation of alternative design concepts as potential solutions to your problem, a systematic screening of those concepts to identify the preferred alternative, and further development of this selected alternative with the details necessary to implement it. For the MBA students, you will also include a marketing plan. As in Progress Report #1 the relevant portions for the MBA students are highlighted.

Grading:

Point deductions of up to 10% may be expected for work that does not communicate information effectively, is sloppy, unorganized, or not checked for spelling and grammar.
Please submit as a single pdf and limit the main text to 12 pages (not including 10 page marketing plan or appendices).
Progress reports are meant to be detailed, though you are encouraged to be clear and concise in the text and make good use of figures, tables and appendices. While it is good that figures and tables stand alone, don't assume that they will--i.e. highlight important points or summarize in the text. Provide sufficient background material and detail so that an engineer unfamiliar with your project might understand your motivations. The report should also be neat, organized and checked for grammar and spelling. It should include the following items:

1. Concept generation.

Summarize your concept generation process. Consider grouping ideas together by common principles. Consider separately addressing subsystems by function. Present 3-5 alternative design concepts which you have considered in greater detail. Be sure to discuss/ illustrate the physical principles involved, the basic materials and geometries. Use sketches, equations, etc. where applicable.

2. Concept screening/ selection.

Present the results of a systematic screening of your 3-5 concepts to identify the preferred solution to implement. Justify your choices. Use a selection matrix or table. Show the results of any calculations or bench testing that you may have done to support your decision. Identify any key systems, subsystems and interfaces.

3. Materials and manufacturability.

Provide a thorough analysis of materials and manufacturability as it pertains to your selected design. If your design will involve machining or other manufacturing processes, document your consultation with the TAs and the EFL/ BMEFL manager regarding these issues.

4. Detail drawings.

As pertinent to your particular project: Detailed engineering drawings necessary to manufacture your device (i.e. where a device is involved). Otherwise, detailed diagrams/ flowcharts of your process necessary for someone to understand/ reproduce it. Document/ describe subsystems and assemblies, circuits, the flow of information, etc.

Additional Deliverables for MBA students (graded by Dr. Aravindakshan):

1. Marketing plan (10 additional pages)

As part of the marketing plan, you will propose standard product launch activities that include, but are not restricted to, forming price ranges, estimating market potential (market size and potential share), analyzing (comprehensively) the competitive landscape and developing a distribution strategy. The price ranges, market potential, and costs associated with product design and manufacture, as well as the costs of your communication plan, should furnish enough information for you to conduct a thorough profit and loss (or break-even) analysis.

Finally, apart from accounting for the considerations of your marketing plan in the launch strategy, you must also develop an effective communication plan (message and channel). So your group needs to synthesize and convert the technical advances of the new product into knowledge and benefits easily accessible to the average user of the product. This should also help you finalize your positioning plan.

Below we present some guidelines for a successful collaboration:

We are fortunate to be able to provide an interdisciplinary team experience for the BME senior design and MBA New Product Development courses. Everyone must contribute in order for this partnership to work. These types of mixed teams are typical of what you will find in the workplace, so this is an excellent opportunity to prepare you for the workplace.

Guidelines for collaboration

Communicate, Communicate, Communicate

Although parts of the assignment may be delegated to make best use of teamwork, you exist as a team and are responsible as a single entity for all deliverables.

1. First day of class or first meeting (whichever comes first) exchange e-mail addresses and phone numbers
2. Be prompt with replying to communications (same day of receipt preferable)
3. Share all data and information
4. Meet regularly (at least every week through Progress Report #1, every 2 weeks prior to Progress Report #2)
5. Generate and update timelines regularly
6. Schedule client meetings together to optimize use of client time, meet client at least 3 times over the quarter (at beginning, middle, and end)
7. Don't let time pass by with unresolved issues, meet all issues head on and quickly
8. All orders are to be placed through the BME office/TAs. There is a limited budget and the amount changes each year depending upon the number of teams and complexity of the designs, so please pay close attention to announcements from Dr. Passerini regarding the budget amount. This includes materials or print jobs for the brochures and posters etc.
9. If something is unclear-- ask! Do not make assumptions.

Course Schedule

Date	Topic
	Introduction to the Innovation Process
1/7	Class Logistics Assignment of groups and projects Meeting with project partners from the Engineering School (*Tentative*) **Reading** 1. The Path to Epiphany: The Customer Development Model (Chapter 2, *The Four Steps to Epiphany*, Blank 2004)
	Identifying Opportunity and Assessing Market Potential
1/14	**Readings** 1. Turn Customer Input into Innovation (Ulwick 2002) 2. The Customer Centered Innovation Map (Bettencourt & Ulwick 2008) *Supplemental Reading for Progress Report #1* a. Customer Discovery and Validation for Entrepreneurs (Cespedes, Eisenmann & Blank 2012) b. Direct Observation: Some Practical Advice (Patnaik & Becker 1999, A Jump White Paper, http://bit.ly/dsCuq9). c. Bootcamp Bootleg (http://stanford.io/ipaPIa) **HW1**: a. Votizen (A) & (B) (Han & Siegelman 2012) (***Due: 1/21***)
	Design & Ideation
1/21	**Readings** 1. Design Thinking. (Brown 2008) 2. Energizing Innovation Through Design Thinking (Cindy Tripp 2013) 3. Design Thinking and Innovation at Apple. (Thomke & Feinberg 2012)
	Concept Testing
1/28	In Class Exercise on Design (100 minutes)
	Empathy & Observational Skills
	Reading 1. Concept Testing (Dolan 1989)
	Progress Report #1 Due on 2/3
2/4	**Progress Report #1 Presentations** *Groups will present their results till date. Class will work on understanding and potentially improving upon the group's solution*

New Product Launch Strategies	
2/11	**Readings** 1. Dropbox: 'It Just Works' (Eisenmann, Pow & Barley 2012) 2. TruEarth Healthy Foods: Market Research for New a Product Introduction (Kasturi Rangan & Yong 2009) **HW2:** Metabical: Pricing, Packaging and Demand Forecasting for a New Weight-Loss Drug (Quelch & Beckham 2010) (***Due: 2/25***)
2/18	**Cannibalization - Reading** 1. Kookaburra Cricket Bats: Dealing with Cannibalization (Hennessy 2012) **Conjoint Analysis** *What is Conjoint Analysis?* a. Prior to class visit: http://bit.ly/fI1dqA b. Also visit: http://www.sawtoothsoftware.com/solutions/conjoint_analysis Look at their short video tutorial and then demo the conjoint surveys for CBC, ACBC, ACA and CVA. ***Come to class prepared to discuss your understanding of the method***. Did it work for you? What were your results from the demo? What product recommendations did you receive? How were the questions structured? *Why is it used?* – **Reading** 1. A Practical Guide to Conjoint Analysis (Wilcox 2003)
2/25	**Reading** 1. Alpen Bank: Launching the Credit Card in Romania (Kasturi Rangan & Yong 2012) 2. Metabical: Positioning and Communications Strategy for a New Weight Loss Drug (Quelch & Beckham 2010)
Progress Report #2 Due on 3/3	
New Topics in Innovation	
3/4	**Collective Intelligence – Readings** 1. OpenIDEO (Lakhani, Fayard, Levina & Pokrywa 2012) **Class Wrap-up** *External Speaker (Tentative)*
3/11	**Progress Report#2 Presentation**