

NEW PRODUCT DEVELOPMENT AND FEASIBILITY: BLURRING THE LINES BETWEEN INDUSTRIAL DESIGN AND MARKETING

Michael Caston, IDSA, MID
Metropolitan State University of Denver
Mcaston3@msudenver.edu

ABSTRACT

During the product development process, industrial designers and marketing professionals often work collaboratively. Yet, within a typical industrial design education, design students are minimally exposed to the discipline of marketing. When industrial design students graduate, they will possess the knowledge of 'how' to design a product, but often lack the knowledge as to 'why' they are designing a product. Since it is widely accepted/acknowledged that 80-90% of new products fail within 5 years (Castellion 2013), it is imperative for students to realize that before a product is designed or expensive prototypes are developed, there must be a clearly identified need and a demonstrated market demand for it. Establishing a market demand early increases the potential success of the product. Furthermore, since industrial design education rarely focuses on marketing, students are ill-equipped to adequately communicate with marketing professionals because they are not familiar with the concepts and terminology commonly used. This gap in their education makes it more difficult for students to collaborate with marketing professionals when they enter the workplace. In an effort to expand industrial design students' perspectives and better prepare them for successful careers in product development, a professor of industrial design at a university in the Rocky Mountain region redeveloped the learning objectives for a senior level studio course to include in-depth exposure to intensive market research.

INTRODUCTION

Interdisciplinary education has been shown to be very beneficial to the well-rounded education of students preparing to enter professional fields (Pracilio, 2010). In product development, industrial designers communicate daily with a large variety of professional disciplines which can include marketing, engineering, manufacturing, quality control, sales, customer service, and the members of the distribution chain. Industrial designers are often serving in a liaison capacity with these disciplines because their work touches on many areas of product development. When broadening industrial design students' perspectives of the surrounding disciplines involved in product development, engineering and manufacturing are often the focus. Concentrating heavily on the latter stages of product development can leave industrial design students believing that product development begins with industrial design. Are we providing the most holistic design education with this imbalanced and narrow approach? Do students fully understand the marketing perspective which is often the driving force behind new product development? This paper reports on the efforts of a professor of industrial design at a university in the Rocky Mountain region, who, having worked professionally in the field of marketing, decided to assign projects in which students focus on the marketing research aspects of product development in order to better prepare them for successful careers.

BACKGROUND

In industrial design education, interdisciplinary projects have been shown to be impactful to the learning outcomes desired by educators (Maass, 2011). The efficacy of implementing interdisciplinary projects depends heavily upon the desire of students to further broaden their perspective of the entire scope of the product development process (Caston, 2014). In an effort to achieve this, a senior-level studio course was selected by a professor of

industrial design as an opportunity to expand on the product development process and focus heavily on the front-end of product development; more specifically marketing and new product feasibility.

In the first two weeks of the semester, several lectures were delivered to the class discussing the 'big picture' of the product development process. Several narrative examples were presented to students to demonstrate the expansive and expensive process of realizing a new product in the marketplace. These product examples ranged in development time of one year up to five years, included development teams of six people up to nearly 20,000, and production costs ranging from \$300,000 to \$6 billion (for the development of the Boeing 777 airplane) (Ulrich, 2006).

At the onset of the project, guest-lecturing was also employed to further expand upon the early stages of new product development. These guest-lecturers were recruited from internal sources, such as the university's business school and marketing department, and from external sources including a wealth of professionals in different fields involved with product development. In exchange for the guest-lectures from the business school, the industrial design professor reciprocated lectures in senior-level marketing courses discussing industry practices and collaborations between marketing and industrial design.

Lectures on the "big picture" of the product development process continued throughout the semester, yet the first two-weeks of intensive lecturing helped prepare the senior industrial design students for the introduction of the marketing-focused, semester-long project titled "New Product Development Feasibility Plan". The main objective for the project was to place students in a position where they developed a new design while simultaneously working to determine its marketability. **An important stipulation of the project was that students were required to complete their feasibility study and prove marketability BEFORE proceeding to the prototyping stage.** The summary of the market research ultimately informs the design process and determines the form, function, features, materials, manufacturing methods, price point, target market, etc. for the product.

Through this project, the marketing topics include:

- Opportunity Identification
- Market Research Methods
- Concept Evaluation
- Market Analyses: Target Market, Environment, Industry, Competition
- Strengths, Weaknesses, Opportunities, Threats (SWOT)
- 'Product-Market Fit' (Kolko, 2014)
- Market Feasibility (potential for market success)

PROJECT FORMAT

As in most industrial design programs, students are required to maintain "idea" or "sketch" notebooks. These notebooks are filled with sketches of various forms, products, systems, people, architecture, etc. Each day of their college careers, industrial design students are encouraged to record observations of existing problems they encounter as well as the potential products they envision that can address these problems. As a starting point for this project, students were asked to extract and develop from their "sketch" notebooks a minimum of twenty concepts they were especially passionate about.

In the second week of class, students were expected to present to the class these product concept sketches that address an observed problem. After each student presentation, the professor lead a class discussion into the relevancy and potential feasibility of these concepts in order to better narrow down the ideas for the purposes of the project. As a group, fellow classmates then rated the concepts and identified the top three ideas for each individual student to then conduct cursory market research, which could include competitive analysis, materials or technology feasibility, or determining the size of the existing market. The types of market research depended on the individual students' concepts.

By the next class session, students were expected to have developed five iterations for each of the three chosen concepts to present to the class in a second review period. During this second review period, each student presented their concept variations as well as their initial research. The class as a whole then discussed and decided which one of the three concepts had the greatest market potential and was most deserving of further in-depth market research and simultaneous product development. Once these two initial sketch reviews were complete, each student in the class had a single product concept that had been vetted by the entire class.



Students providing feedback on their peers' initial concepts

Once individual students had a concept to focus on, they were able to delve into the market research necessary to direct their product design. Each student began with primary research by developing and distributing one or more surveys to a targeted audience. The main goal of their primary research was to identify and narrow in on their target market in order to gain unique insights into which aspects of their design problem was most important to their intended user. Students were also required to venture out in the field to conduct one-on-one interviews, fly-on-the wall observations, shadowing, design ethnography, simulation exercises, focus groups, and competitive testing (Martin, 2012). Since each student had a unique product concept, they were afforded the opportunity to explore a large variety of primary design research methods for gathering information and pin-pointing design opportunities.

In addition to their primary research, students conducted secondary research through the consultation of publications specific to their product area as well as websites and databases containing statistics in their product's industry, environment, manufacturing methods, materials, competitor benchmarking, socio-economic data, federal regulations, etc. Some of the online databases available to students included: *Ibisworld.com*, *Statista.com*, *Census.gov*, *Fedstats.gov*, *Sec.gov*, *Hoovers.com*, and *CPSC.gov*. As students continued their market research, they began to organize the data they were discovering in order to interpret it, and develop very specific insights about the market to guide their design process (Kolko, 2014).

The deliverables for this project included sketches, surveys, sketch models, materials/manufacturing experiments, and most importantly, a summary of their research in the form of a lengthy feasibility plan. A feasibility plan template was provided to students by the professor to use as a starting point.

This template included the following sections and sub-section headings:

- a) **Table of Contents**
- b) **Introduction and Problem Statement**
- c) **Product Brief and Goals Synopsis**
- d) **Opportunity Identification and Definition** - observations, interviews, surveys, trends, general statistics
- e) **Target Market Analysis** – demographics, market size, branding, trends
- f) **Environmental Analysis** – economic, technological, political/legal, and sociocultural environments
- g) **Industry Analysis** – size, government regulations, geographic locations, trends, seasonality, segments, distribution channels, complementary products
- h) **Competitor Analysis** – products, pricing, features/benefits, advantages/disadvantages
- i) **SWOT Analysis** – strengths, weakness, opportunities, and threats (summary of trend analyses)
- j) **Product Design Process** – sketches, sketch models, development, testing (materials and manufacturing), iterations
- k) **Cost / Profit Analysis**– quotes for manufacturing, product pricing
- l) **Conclusion**
- m) **Works Cited**

Typical feasibility plans or business plans found in industry are dry and determinably ‘boring’ in their graphic layout. Students were expected to actually design their feasibility plan, much as they would design their typical product design project presentation or portfolio. The most impactful component of these well-designed feasibility plans is fundamentally the conclusion section where the student will ultimately sum up their findings to answer the question, “Is this product feasible for success in the marketplace?” The answer to this question will determine whether or not this product concept should be considered for further development through the typical stages of the product design process that industrial design students are already familiar and experienced in.

Through assignment of this project, there are inherent opportunities to touch on additional topics that are often overlooked in a typical industrial design education. This project is structured so that a student can either develop the chosen product concept as if they were an employee of a specific company (e.g. an industrial designer employed by Nike, designing a new shoe concept to be issued with the next product release cycle) or if they were going to take this new product to market themselves as an independent entity or entrepreneur. The flexibility in the outline of the project allows for touching on business-related topics (either corporate or entrepreneurial) to include business models, funding options, and intellectual property.

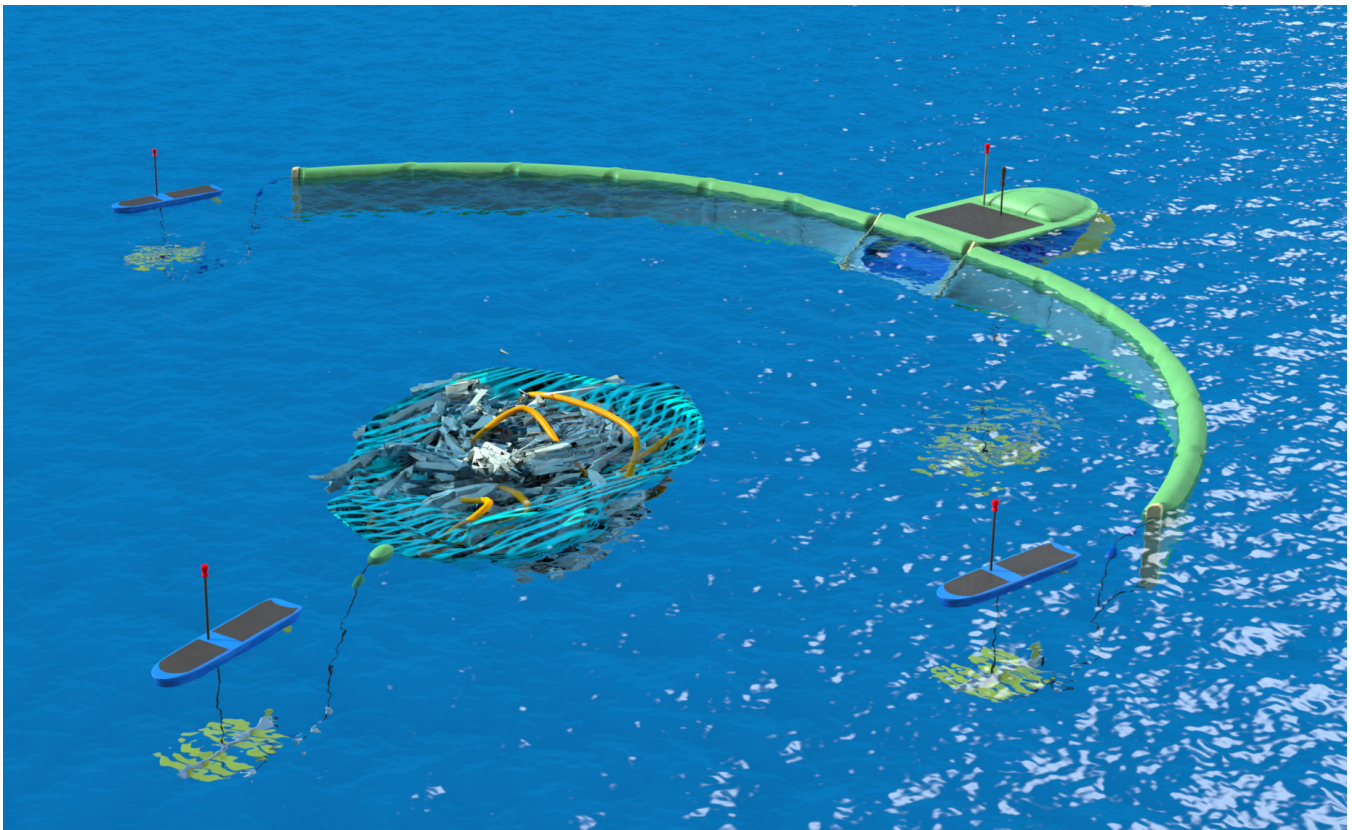
The following are a few examples of products that students developed through their feasibility studies:



Tactile button system for touch screen gaming (credit: Eric Gilger)



Household product for rinsing and cleaning quinoa (credit: Derek Berthold)



Ocean garbage collection system to address the 'Pacific Garbage Patch' (credit: Ryan Mooney)



Diaper bag system designed for men with the option to convert to backpack (credit: Megan Hull)

CONCLUSION

The most challenging aspect of this marketing-focused industrial design project for the educator is in the conveyance to the students of the absolute necessity of conducting market research in advance of taking a concept through the product design process. All too often, students seem to prefer to skip over the necessary, preliminary research phases and go immediately into “building” or prototyping. In such cases, students do not initially understand that if there is not an established consumer need or demand for a product and proven profit potential for an organization, there is no reason to invest in the development of a new product. When students eventually enter the working world, it is possible that they will be handed all the completed and required market research from the company’s marketing department in order to fully develop a new product for market success. However, it is also possible that they will be expected to conduct much of the market research themselves in order to justify the further development of that product. Regardless, the experience obtained through the aforementioned industrial design project, which focuses heavily on market research, will better aid the future designer to communicate on a familiar level with their coworkers in the marketing department and other colleagues within their employing company.

Students have consistently expressed gratitude for this unique learning opportunity and a desire to have been exposed to similar projects concentrating on the marketing aspects of product development earlier in their industrial design education. Students feel they are finally receiving a component that was otherwise missing in the product development process and will ultimately make them more impactful and successful once they enter the professional world.

REFERENCES

- Cagan, Jonathan, and Craig, Vogel. *Creating Breakthrough Products: Innovation from Product Planning to Program Approval*. Upper Saddle River: Prentice-Hall, 2002. Print.
- Castellion, George, and Stephen K. Markham. New Product Failure Rates: Influence of Argumentum ad Populum and Self-Interest. *Journal of Product Innovation Management*. Volume 30, Issue 5, pages 976–979, September 2013.
- Caston, Michael, and David Klein. (2014) Community Engagement: Exploring Commercial and Nonprofit Options, *Proceedings of IDSA Education Symposium*, August 12-16. Austin.
- Godin, Seth. *Purple Cow: Transform Your Business by Being Remarkable*. New York: Penguin Group, 2009. Print.
- Kolko, John. *Well Designed: How to Use Empathy to Create Products to Create Products People Love*. Boston: Harvard Business Review Press, 2014. Print.
- Martin, Bella, and Bruce Hanington. *Universal Methods of Design*. Beverly: Rockport Publisher, 2012. Print
- Maass, K., Talley, B. (2011) Sponsored Design Studios: An Absolute Necessity. Best Practices for Intellectual Property and Engaged Scholarship, *Proceedings of IDSA Education Symposium*, September 14-17, New Orleans.
- Ulrich, Karl, and Steven Eppinger. *Product Design and Development*. New Delhi: Tata McGraw-Hill, 2006. Print.
- Valerie P. Pracilio, The Value of Interdisciplinary Education: Learning Together Helps Make Care Safer. *Health Policy Newsletter*. Vol 23, No. 2, 2010, Philadelphia, PA.