The Focus of Industrial Design Education: Perspectives from the Industry

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The Need for Study

Industrial designers are facing unprecedented competition in the United States. There are several new industrial design programs and they are graduating more students each year. Korea and Taiwan have each doubled their industrial design programs in the last decade to almost equal that of the U.S. There are more than 11,000 industrial design students graduating each year from 230 schools in China (National Instructive Committee of Industrial Design Education China, 2005). Meanwhile, there are more than 1,000 industrial design firms in the US. We investigated and discovered the year that 286 of them were founded. Approximately 20% of them were established in the last five years and 50% in the last ten years. With the deluge of graduates and the advent of manufacturers outsourcing their designs overseas (Engardio and Einhorn, 2005), the job market has become fiercely competitive. Industrial design education needs to prepare students to be more effective and efficient when they join the industry. Understanding the expectations of the industry should provide valuable insight into how design schools in the US can educate their graduates to be more competitive in the marketplace.

As mentioned by Professor Paul Rothstein of Arizona State University (2005) in an Innovation article, “Reimagining, redefining, and retooling the value exchange between education and practice is long overdue and urgently needed as international competition rises to new heights.” This research is intended to provide a perspective according to the design industry. This investigation of the industry’s requirements will discover a priority of necessary design skills, the degree to which industry is satisfied with recent graduates’ skills, and the focus for industrial design faculty. These perspectives should help industrial design educators to acknowledge the expectations of the industry for their students and to direct the curriculum towards enhancing the competitiveness of practicing designers.

Method of Study

Survey Questions
The survey was distributed through one-on-one e-mail to respondents. A variety of question formats including matching, ranking, and choice were used to gain a more complete perspective. This 18-question survey appealed to a varied population of design professionals on several issues pertaining to design education including the priority of various design skills; areas needing improvement in design education, company hiring practices, and the transition of the terminal degree for industrial design educators from Master’s to Ph.D. Significant data about each respondent’s organization’s size, revenue growth rate, outsourcing policy, organization, and hierarchy was also collected. A range of organizations was polled, from small design consulting firms to large-scale manufacturing corporations.

Participant Selection
An in-depth survey was distributed to a broad spectrum of 1,343 designers, managers, and executives working for both design consulting firms and manufacturers. Individuals selected to receive the survey were listed in the membership directory of the Industrial Designers Society of America (IDSA). The first round of surveys was sent to all design consulting firm department
heads listed in the IDSA directory. The second round of recipients consisted of all listed designers and managers working for manufacturers. This selection of recipients was intended to promote a diverse and well-balanced response with views represented from designers to managers to executives.

Limits of Study by Survey

After receiving survey results, there were factors of concern. The first factor was the 9.3% rate of return, which may indicate that only those who felt strongly about the issue completed the survey. If this is the case, the results may demonstrate a more polarized-specific response of those who are most affected rather than the broad-based sentiment of the entire group. However, the overall results of this study were quite consistent despite the concern of a lower response rate than expected. The second concern is inherent in polling surveys; respondents are limited to the answers provided by the survey author. This problem was addressed in part by the addition of an “other” option in many cases, in which a field was provided for a respondent to add his or her own response. Another limitation of this type of research is that some respondents felt the questions were too vague or too general. Further, it was difficult to rank the value of certain skills, which all seemed important. These concerns are all recognized limitations of opinion polling. Despite this, the survey method provides the most correct first hand information in accordance with an accepted standard, as well as, providing quick and easy-to-analyze data.

Results of Survey

Most of the respondents work for manufacturing corporations (59%) or for consulting firms (26%). The sizes of the organizations surveyed include a wide range; some 21% have between one and ten employees and 56% employ more than 200 people. Seventy-three percent of the manufacturers that were surveyed have more than 200 employees and 44% of the design firms employ less than 10 people.

Eighty-two percent of the respondents hold bachelor’s degrees and 17% have master’s degrees. Ninety-two percent hold degrees specifically in the field of design. Respondents come from a variety of industry backgrounds and environments, as well. Both large and small companies are represented; from design firms and manufacturing facilities, from consumer products to industrial equipment, from well established, mature organizations and new, up-and-coming firms. Most companies do, however, have a strong emphasis on, and respect for, industrial design.

Since the sample population was taken from the IDSA directory, most of the respondents had a design department consisting of two or more designers. The survey results indicate that industrial design has, on the whole, plays a more (41%) or much more (29%) important role for manufacturers than it did five years ago. No more than 26% think the importance has remained the same and only 4% answered that industrial design is becoming less important in their organizations. This increasing significance indicates that corporate America is focusing on industrial design as a strategy to help answer escalating international competition and satisfy more demanding consumers. Over the past five years, the revenue of 80% of the organizations has increased, with 43% growing more than ten percent. It is relevant to note that of the manufacturers whose industrial design function has become much more important in the past five years, 63% of them reported a more than 10% average annual growth (Figure 1). This reinforces the findings of Hertenstein, Platt, and Veryzer (2005) that industrial design is able to enhance a company’s financial performance. With such high rates of growth for companies placing a great value on industrial design, the quality of design graduates is becoming increasingly important to corporations in America.
According to manufacturers for whom Industrial Design has become much more important, revenue for the last five years in the company:

- Growing More Than 10% Annually: 63%
- Growing Less Than 10% Annually: 32%
- About the Same: 5%
- Decreasing Less Than 10% Annually: 0%
- Decreasing More Than 10% Annually: 0%

As many manufacturing facilities leave the US, design, and more specifically, design that meets the needs of Americans—becomes more and more important to the future US economy. In order to produce quality graduates as viewed by the industry, design education must be sensitive to the needs and desires of the industry, and ensure that transitions and new requirements for design educators further increase the quality of its graduates.

What Does Industry Most Want from Design Graduates?

One of the first questions in the survey solicits respondents to rank the most important criteria for hiring new designers. The design industry expects graduates to have certain skills upon degree conferral, and it is important that educators understand the industry's needs so that students can be duly prepared. According to the responses of this survey, a design graduate’s portfolio is the most important factor in the hiring process (Figure 2). A nearly equal amount of emphasis was placed upon creativity. The third most important factor was a graduate's experience. Resumes, GPAs (grade point averages), and the use of entrance tests were rated with less magnitude.

Portfolio, the most important factor according to this survey, presents a potential job candidate’s design skills integrated with his/her creative ability and problem solving capability. This finding resonates with the results of another question (Figure 3), which asked respondents to rank a list of skills deemed to be most important for design graduates to posses. Results from this question show that problem solving and innovation, closely followed by sketching are the top three sought-after skills, echoing the most important criteria for hiring designers—portfolio and creativity—as outlined previously. Each skill has a score nearly equal to that of the other, falling within a three-point range of importance. Of secondary importance were teamwork, verbal, and materials skills, followed by computer-aided drafting (CAD), styling, production, anthropometry, marketing, human factors, and technical engineering skills. The category model making was ranked least important. However, the difference between the least important and most important categories is only a few points, indicating that after problem solving, innovation, and sketching, all other skills are similarly important, with the exception of model making. A balanced design education centered on these three major skills seems to be the expectation from the industry.
What Areas Need Improvement?
Following the question of most important skills for design graduates, it is relevant to explore the areas in which design graduates need the most improvement. According to this survey, practicing design professionals see innovation, problem solving, and sketching (three of the most important skills for graduates to possess) as needing improvement. Respondents were moderately satisfied with students’ sketch abilities. Another interesting note—model-making was given the highest level of satisfaction when professionals were asked to rank the abilities of recent graduates (Figure 4), yet it is the least important category when professionals were asked to rank the most important skills for an industrial designer (Figure 3). This is likely due to the decreasing need of
model making skills for industrial designers in this era of rapid prototyping and the increasing value of time (Reeder, 2004).

**Figure 4**

 Abilities of recent Industrial Design graduates:

- Sketching skills were rated fifth, innovation was seventh, and problem solving was ninth, out of 14 different abilities taught in industrial design programs. It should be noted that these three skills need improvement because they are the most important skills an industrial designer can possess.
- Other areas of improvement, such as verbal skills, teamwork, technical engineering, marketing, and knowledge of materials need to be addressed because they were rated substandard for graduates.
- Areas of materials knowledge, technical engineering, and marketing are shown as needing more improvement. The field of marketing is rife with research opportunities and students will only benefit from learning basic marketing concepts and understanding how products should be designed to compete in the marketplace. Fundamental marketing research strategies are necessary for designers to understand their target market and by placing industrial design students in a more business-like context, such as industry collaboration projects where they must practice real-world design processes, will help them know what to expect and what is expected of them as they move into the work environment.
- However, in the case of material knowledge and technical engineering, especially when the vastness of these areas is considered relative to the amount of time and experience a student may give to these areas during his or her schooling, it is not likely that a student will become absolutely prepared for all feasible situations in materials and engineering. Most manufacturers have specific needs for materials and engineering, and it is not realistic for design students to be expected to have mastered those needs simply by studying a materials book or visiting manufacturing facilities. Perhaps, taking into consideration the sheer vastness of materials and
engineering details, an industrial design curriculum should focus on providing students with a basic understanding of industrial processes, an awareness of the many different types of materials available, and basic marketing and research concepts involved when developing a new product. As a new industrial designer becomes more experienced in his or her chosen field, his or her expertise in the areas of materials and technical engineering most important to that field will increase.

Focus of Faculty
The survey also addresses the industry’s preferred focus of industrial design university faculty. This survey shows that research geared for publication and design competitions were the lowest-ranking categories, indicating that the design industry does not see them as being readily applicable to the teaching of problem solving, innovation, and design skills, which make up the primary need from the point of view of industry (Figure 5). Though it is important to recognize, understand, and advocate the need for pure research, it should not suffocate the longstanding practical tradition of teaching industrial design skills.

How Does Industry View the Transition Toward Ph.D. Design Faculty?
There is an ongoing trend toward making a Ph.D. a required degree for design faculty. A majority (71%) of survey respondents disagreed (34%) or strongly disagreed (37%) with the statement “PhD will improve design education” (Table 6). Only four percent agreed with the statement, while three percent of respondents strongly agreed. Twenty-two percent marked, “neither agreed nor disagreed.” When separated by industry, 74% of consulting firms disagree or strongly disagree and 70% of the manufacturers disagree or strongly disagree with the statement. This response sends a strong signal to educational institutions; most designers and design managers do not see the benefits of incorporating a Ph.D. as the terminal degree for design educators. This finding is also consistent with a previous part of the survey in which respondents rank areas they consider most important for design students to be trained. While professors with master’s degrees aptly teach design skills, problem solving and innovation, the necessity of a doctoral degree, which is centered on research and publication, ranked least important. Overall, the message from the industry is that industrial design education should be focused on teaching design skills along with creativity and problem-solving methods rather than research and publication.
Feelings on whether a PhD should be required as a terminal degree:

- Strongly Agree: 3%
- Agree: 4%
- Neither Agree or Disagree: 22%
- Disagree: 34%
- Strongly Disagree: 37%

This data was further analyzed to explore the range of responses of those with advanced degrees. An interesting correlation was discovered—respondents holding advanced degrees were more likely to disagree with the statement. Of those surveyed who have graduate degrees (18%, Figure 6), 40 percent strongly disagreed with the statement that transitioning to a Ph.D. as a terminal degree will improve the quality of design education. Another 36% of those with advanced degrees disagreed with the statement. The percentage of those holding masters or doctoral degrees that disagree or strongly disagree is 76% compared to the 71% that either strongly disagreed or disagreed from all those who replied. Perhaps because these respondents are more familiar with the process of procuring an advanced degree, they were more likely to have a strong opinion. Having firsthand experiences with graduate school may have convinced the respondents who disagreed with the above statement that students would not benefit a great deal from faculty members having more advanced degrees. Fewer respondents (14%) selected “neither agree nor disagree.”

Conclusions of Study

In no way should the growing numbers of industrial design programs and design firms be perceived as a hindrance. It is a boon for industrial designers that manufacturers and consumers have a clear respect for design. Unmistakably, design and designers are seen as more important and somehow responsible for enhancing corporate revenue. Nevertheless, the increase in competition and the flood of new students graduating from increasing numbers of programs around the world can be daunting if the programs from which they are graduating are not preparing them to meet the standards sought by industry.

This study merely highlights the importance of an exchange between the needs of the university or design curriculum and the requirements of the industry. Rothstein (2005) wrote of the importance of collaborating with the design industry, in both traditional and in non-traditional ways, to boost the value of design programs in the eyes of university administrators: “Our education programs, with more innovative and substantial involvement from design practice, must find ways to reinvent the value proposition on campus and emerge as an asset...to university leaders”. However, Rothstein’s comments were mainly intended to show how a design education program could position itself to further align with its parent university’s goals, thereby increasing
its value to the university. For this reason among others, it is vital that the design industry must understand and support design education.

This study is simply a preface to the needs of industrial design education, as the number of practicing industrial designers listed in the IDSA directory limited the sample size of the survey; nonetheless, results are consistent throughout the survey. The message from the industry clearly indicates that design professionals prefer students to focus on their design skills and sharpen their creative/innovative abilities as they attend school. These abilities are the foundation needed for more competitive practicing designers. They do not advocate a complete revamping of university requirements, such as requiring a Ph.D. to teach design skills. Most designers surveyed think that education provides adequate problem solving, innovation, and sketch skills even though they see significant room for improvement. With new technologies becoming the current driving force of innovation, these skills will be even more valuable as designers move even further into unknown territory. As industrial design is evolving to become the integrator of engineering and marketing (Ellis, 1994), a product should be designed to optimize its human, technical, production, and marketing functions through effective design skills (Liu and Hannum, 2005). Further, the survey concludes that the industry perceives the need for enhancing marketing, material, and technical engineering abilities as global market competition intensifies.

The perspective of the industry provides a practical view and a valuable reference for today’s design education to prepare students to compete successfully in the ever-challenging design world. The real needs, from the perspective of the industry, will remain the ability to teach design skills, to inspire creativity, and to educate students to intelligently solve the problems that they will face everyday in their design career. In the pursuit to outlast and outperform international competition, it remains the mission of today’s educators to develop fresh designers equipped with the skills needed to succeed.

References


