

TEACHING STUDENTS HOW TO PROFESSIONALLY AND PERSUASIVELY ACT AS DESIGN CONSULTANTS IN COLLABORATIVE INDUSTRY PROJECTS

Andre LIEM

Norwegian University of Science and Technology, Department of Product Design

ABSTRACT

The motivation for undertaking collaborative design projects within the context of consultant – client relationships, is not only to train design students to solve complex design problems, but also expose them to pro-active teamwork. Pro-active teamwork in studio teaching refers to a learning concept, where student groups are required to act as design consultants by identifying and solving strategic design problems as well as persuasively communicating them. The term “Persuasion” is central in this paper and will be discussed within the context of the Product Planning and Goal Finding as well as the core Industrial Design process.

Factors, which play an important role in facilitating a conducive training and learning environment for students to act professionally, and at certain times persuasively as external consultants, are:

- Type of collaborative project and collaborative attitudes of the industrial counterpart
- Emphasis on design thinking at a strategic or systems level.
- Ability to generate convincing and well presented representations
- Implementation of intermediate milestones in terms project planning and management

Results indicate that a strategic approach in designing is an appropriate way to stimulate independent and interdependent forms of learning and “doing research”. Within the context of “being able to convert research finding and / or design concepts at intermediate milestones of the design process into persuasive proposals”, new learning and communication styles are to be inculcated among students to challenge them to learn and practice design in a reflective, accelerated and professional manner.

Keywords: Industrial collaboration, persuasion, strategic design

1 INTRODUCTION

Within the context of integrated product development, the level of innovative success in formulating an effective product strategy and achieving a concrete design is highly dependent on how thorough product planning and designing activities are carried out in respectively the front-end of Innovation and core industrial design phases. This level of success can be augmented by consciously reminding designers to communicate important design information, whether analytical or creative, at certain milestones during the design process in a convincing and if possible persuasive manner. When preparing design students for the challenges of design practice, it is necessary to consider core-curriculum as well as the above-mentioned communication and persuasion skills in the overall education and grooming of the student. Besides using the studio projects as a platform for developing content-driven design collaborations with a wide variety of companies, its concept can be extended towards training design students how to act as professional design consultants.

This article reports on the phenomenon that students are able to gather and analyse information, but have difficulties in transforming these information into persuasive action plans to propose to a company. The cause of these difficulties is that students do not have the experience yet to converse on “equal terms” and negotiate with companies. Besides this, the content of the strategic design problems is complex and difficult to manage, especially when some form of innovation is targeted. And finally, students usually do not have a clear overview of the stakeholders and stakeholders’ networks and relationships, when it concerns goal finding in the Fuzzy-Front-End stages of the innovation process. Figure 1 illustrates such a complexity, where the relationships between the different types of

innovation, involving the user, context and the company, adopting an emerging design driven approach, are prevalent. It also shows the interconnectivity with various types of value creation and how Product Service Systems are able to contribute.

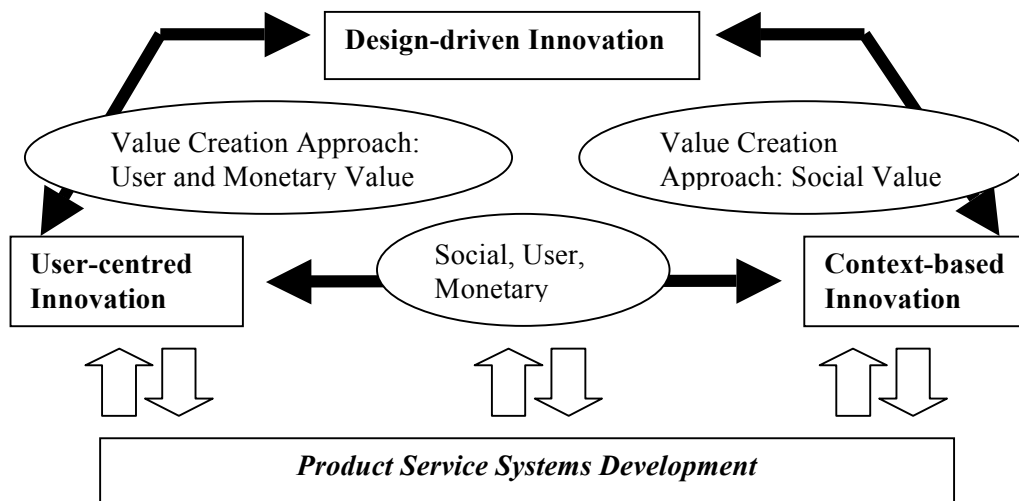


Figure 1. Relationship between different types of innovation approaches, value creation and Product Service Systems development

In the following chapters of this article, the author addresses the challenges of mentoring postgraduate master students in design on how to proactively act as design consultants and communicatively persuade companies to adopt certain innovation strategies and /or embrace new product ideas and proposals. Based on an evaluation of 7 strategic design projects, which were conducted in academic year 2011 / 2012, an action plan for mentoring strategic design projects will be proposed.

2 DEVELOPMENTS IN MENTORING COLLABORATION IN DESIGN

Recently, the ID (Industrial Design) profession have initiated some significant transformations in design education [1] and changed the value and core of the traditional skill sets for an industrial designer. Relevant in terms of design collaboration skills are: 1) The need for designers to understand other design fields and interact more with other disciplines, as the boundary between design disciplines is becoming fuzziest. 2) The ability of the designer to facilitate interdisciplinary teamwork, not only involving traditional issues of physiology, materials and technology related to product development, but also user and lifestyle trends 3) The ability to manage systems, composed of various products and the interfaces among parts, beyond purely the development of individual products with specific functions [2].

Those transformations need to be carefully brought into formal ID education and Design educators need to take more responsibility to update their knowledge about the professional world in order to help students to prepare for the transition from school to work in order to help students be well prepared for the changes. Otherwise, design graduates would face such problems as feeling unready, lack of self-confidence, business awareness and professional skills [3]. However, compared with the development of design practice, design education has developed more slowly over the past decades, and many design schools continue to teach their students with the traditional design skills, knowledge and processes [4]. Only a few design schools are aware of the trend towards collaborative studio teaching and interdisciplinary teamwork in the real world through industrial design projects with students and faculty from departments of business, engineering and social science.

From a methodological perspective, the extent and content of industrial designers' work have differed from those in the past [5]. Besides focusing only on five out of the seven phases in the product development process (task clarification, concept generation, evaluation and refinement, detailed design of preferred concept and communication of results), students also need to be trained to manage and execute the front-end stages of the design process, namely: product planning, production preparation. This is essential, as the global market is becoming increasingly competitive. For example, some international corporations, including Acer, Apple, Philips, Sony, etc. have adapted a holistic

design program to integrate design into the concept-to-market process and let designers participate in decision-making for product planning and positioning [6].

A process model of collaborative design is to describe certain phenomena in which the design tasks are undertaken to possibly reach the final design [8]. Such a model is important for all stakeholders to understand his/her position in the collaborative project, especially in the field of strategic and systems design. According to Kvan, collaboration is a deeper, more personal synergistic process, and its process involves negotiation, agreement, and compromise in order to achieve success [9]. Figure 2 illustrates a general process of collaborative design driven by decision-making. The design information is delivered from initial state to the final state until the decision-making process is completed. The cyclic process involved consultation, negotiation, decision-making, and reflection. This model helps us to understand how 'structured' design collaboration can be implemented within a collaborative studio environment as well as how design assignments and teaching methods should facilitate this integrated way of learning.

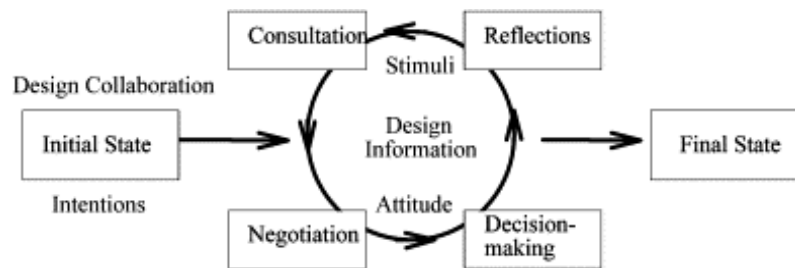


Figure 2. Process model of design collaboration

3 INCULCATING A “PERSUASIVE” ATTITUDE AMONG DESIGN STUDENTS

The continued expansion of designs influences within a diverse range of industry sectors the blurring of career paths for design graduates and further increases the discussion around the demand for designers to possess complementary skills that can be applied beyond traditional design boundaries. This challenges design education to identify opportunities to close the gaps between the skills required by employers in the design industry and those being taught and learnt in schools, colleges and universities. [10]

To exemplify the need for these complementary skills, Spruce has discussed and categorised World of Work (WoW) “skills” [11]. These are the skills, attributes and competences that employers regularly identify as what they actively seek in graduates. They can be briefly identified in 3 key areas detailed below:

- Self-Awareness: To be knowledgeable about your own strengths and weaknesses, your values, your ability to work with others and the factors which motivate you to achieve.
- Organisational Awareness: To be knowledgeable about different organisations: how they operate and who their ‘customers’ are. Also: to show an understanding of the link between your personal values and those of the organisation.
- Making Things Happen to be able to demonstrate potential in key managerial abilities: strategic action and thought; adapting and managing change; and persuading and influencing others.

4 STRATEGIC THINKING COMMUNICATION IN POSTGRADUATE DESIGN PROJECTS AT NTNU DEPARTMENT OF PRODUCT DESIGN

4.1 Educational Framework for Strategic Design and Industrial Collaboration

Much has been debated on how to direct undergraduate and postgraduate studio design teaching to create value-add beyond ‘Core Industrial Design’, focusing on systems and strategic design.

At the Norwegian University of Science and Technology (NTNU) Department of Product Design, an educational framework for systems and strategic design has been developed for undergraduate and post-graduate Industrial Design students to interact and collaborate with Industry as frequently as possible. This framework was based on the concept of collaborative learning through mentorship and scholarship to facilitate a win-win situation among educators, researchers and students [12].

Central in this framework are theories on Social and Hierarchical Learning as well as theories of *communities-of-practice*, and *Legitimate Peripheral Participation (LPP)*. Social learning theory focuses on the learning that occurs within a social context, where group members were encouraged to learn from and communicate with one another, based on concepts such as observational learning, imitation, and modelling [13]. According to Wenger [14], learning is defined as an inter-play between social competence and personal experience. It is a dynamic, two-way relationship between people and the social learning systems in which they participate. In the field of Industrial Design, social learning is embodied through project-based learning and master/apprentice relationships. Design educators both consciously and unconsciously instil fundamental value-systems into students, especially through critiques [15].

4.2 Organisation of Collaborative Strategic Design Projects

Since 2005, 8-10 established Norwegian companies have been yearly involved in 4th year collaborative strategic design projects. The strategic design projects were divided into two stages: a Product Planning & Management (PPM), and an Industrial Design stage. Students were required to adopt the role of design consultants, working groups of 2 – 3. More than 50 companies, such as, Stokke, Håg, Jordan, Ulstein Power and Electro, Tandberg, Lærdal Medical, Glen Dimplex, Vestre, Lego Systems AS etc., were involved from 2005 – 2011.

In the PPM stage, students were subjected to a model for integrated Product Development where they had to follow a systematic innovation-step model, which guided them to determine their design brief [16]. This activity of strategy development and Goal Finding lasted for +/- 6 weeks. Buijs' innovation process was used to introduce strategic design among the students, as no other direct applicable processes were found in the area of Systems Engineering, Macro-ergonomics, PSS Design or Human Centred Design.

As a reference point for industrial collaboration, two alternative forms were suggested:

1. The company does not give a specific design brief to the student team. The company or section is the case itself. During this phase, the team develops a product strategy and proposes / presents to the company what type product, or series of products should be designed.
2. The company gives a specific design brief, but there should be sufficient room for the students to develop their thinking skills at strategic and systems level.

However, in recent years, the introduction of “Value Opportunities” and Value Creation through product /service positioning maps has been implemented to provide a more detailed direction to the design brief [17]. The “How” to design was introduced as a response complementary to the “What” to design as framed by Ansoff's PMT model [18].

In academic year 2011 / 2012, seven projects were introduced in collaboration with five Norwegian companies and organizations. Two projects were completed in collaboration with a local sanitary and kitchen equipment manufacturer. Concerning two other projects, a large organization developing automotive parts and subassemblies was involved. The other three projects were respectively conducted in collaboration with a large Norwegian actor in reverse vending machines, a Norwegian communication equipment provider for the marine sector, and “Nordkapp” Business Park.

5 EVALUATION OF STRATEGIC DESIGN PROJECTS

In this paragraph, the 7 projects are to be evaluated and discussed in more detail. Specific attention will be given on how students behave and communicate with their respective companies at crucial stages of the goal finding and design process. These three stages are:

1. When after an elaborate goal finding process, a product, system or service is being proposed, or a strategic design direction is determined.
2. When design concepts are presented to the company
3. When a final detailed concept is being proposed




Table 1 reports on the activities and results for each company concerning the three stages.

6 DISCUSSION

Factors, which play an important role in facilitating a conducive learning environment for students to act professionally, and at times persuasively as external consultants, are (1) Type of collaborative project and collaborative attitudes of the industrial counterpart, (2) Emphasis on design thinking at a

strategic or systems level, (3) Ability to generate convincing and well presented visualizations, (4) Implementation of intermediate milestones in terms project planning and management.

Table 1. Example of a table

	Stage 1: Product Proposal / Design Direction	Stage 2: Presentation of Design Concepts	Stage 3 Proposal of Final Detailed Concept
In-wall Public Sanitary Accessory Line	Extensive internal and external analysis have been conducted The design goal is vague as contexts, users and design directions were not clearly communicated. The group had difficulties in convincing the company which direction to take. Instead, they asked the company to suggest.	Design Concepts and concept selection were presented in a standard manner. However, a persuasive argumentation for the selected concept was missing. Instead students asked the company to help them select the concept to go further with	The final concept was very well detailed, but the selling features were not highlighted and made explicit 
Next generation Kitchen Sink	Extensive product planning and strategic analysis has led to a well formulated and convincing design goal	Design concepts were worked out and presented in a professional manner and supported by a strong user analysis part. Early involvement of end-users and stakeholders gave the group confidence to propose a concept in a persuasive manner	Final concept was extensively detailed and concluded in a clear advice, addressing usability, aesthetics, production and innovative content. 
La Piuma: Light Weight Car Seat Design	A material and technology analysis, as well as a social and trend analysis on car seats have been conducted. Conclusions were presented at various section of the analysis part in a reporting manner. However, an over compassing and directive strategy is absent.	Concepts were developed to a certain extent. The conclusion was to combine the best features of the three concepts into one final concept. Such a conclusion postpones the persuasive element in the conceptualisation to the final detailing stage (<i>stage 3</i>).	Final concept is well detailed and presented in a persuasive manner by contextualizing the seats in a vehicle interior. 
Electronic Display for Industrial vehicles	A pure information gathering and analysis stage. No strategic directions were discussed and proposed	Concepts were developed and presented in a dominantly visual manner. Although a concept was selected, it was not convincingly presented to the client	The final concept was developed mainly from a styling perspective. No recommendations were made for further development or production.
Reverse Vending Machine for Bulk Feed	A strategic analysis has been conducted and design aims presented. However, these aims were developed in conjunction with, instead of presented persuasively to the company.	Concepts were developed and a clear concept selection has been presented visually and formulated. However, persuasive reasoning to the company was missing. The company led the selection.	The concept has been further developed and communicated convincingly in the form of visualisations, accompanying interfaces and user scenarios
Versatile Communication Touch Screen Interface for the Marine Sector	Market Research explained how to position the product, while the workshops provide directions on the design requirements	Paper prototypes were developed and tested with various stakeholder groups in an iterative manner. No milestone has been set for a persuasive concept presentation.	The final design proposal of the user interface was presented dynamically and contributed in terms of persuasiveness.
Norwegian Seabird Centre	Strategic analysis has led to a concrete and well formulated design brief with design objectives	The overall Seabird Centre comprises of various attractions, which were briefly conceptualised	The final conceptualization is more convincing, as it has been presented through CAD more systematically and cohesively

Reference to the analysed projects, it can be said that in 5 out of the 7 projects, students had difficulties in presenting a persuasive design goal to their companies. Reasons were that these companies provided a rather narrow design brief from the start, which does not encourage strategic design thinking so much. Inherently, this also shows the collaborative attitudes of the industrial counterpart, which in most cases are less supportive in their processes. Concerning the design concept stage, only one project group has presented their concepts and concept selection in a convincing and persuasive manner. This is because the company involved end-users and stakeholders early in the designing process. In the other projects, the final decision-making was transferred to the company or has been postponed to the stage 3. In stage 3, 6 out of the 7 projects were presented convincingly and to a certain extent persuasively to their client company. However, the persuasiveness has been achieved through well-presented visualizations.

To conclude, a strategic approach in designing is a good way to stimulate independent and interdependent learning and “doing research”. Within the context of “being able to convert research findings and / or design concepts at intermediate milestones of the design process into persuasive proposals”, new learning and communication styles are to be inculcated among students to challenge them to learn and practice design in a reflective, professional and persuasive manner.

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