

EXPERIENCING CHINA: AN INTERNATIONAL PROJECT TO PROMOTE DESIGN IN INDUSTRY AND UNIVERSITIES IN COLOMBIA

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ABSTRACT

The Department of Product Design Engineering at Universidad EAFIT (Medellín, Colombia) created the “China 2012” international project in order to experience the evolution that is currently taking place in China –“Made in China but Designed in China too”– and contrast this phenomenon with the Colombian case to see how can strategies be developed to support universities and industry, in order to better lead a culture of New Product Development. Different Product Design Engineering profiles participated in the project: undergraduate (8) and alumni (3), master students (4) and university professors (5). The project was structured around several strategies that included activities before, during and after travelling to China: academic lectures, visiting academic peers (Hong Kong Polytechnic University and Tsinghua University industrial design schools), visits to design companies and attending the Canton Fair and Product Design Centre. Finally, after each scheduled activity, reflection meetings were held in each strategy to evaluate learning.

Keywords: Product design engineering education, design and manufacturing, globalization

1 INTRODUCTION

Experience, not knowledge, is what transforms a human being. Knowledge is just a component of experience, which is a set of variables that actually complete the transformation. In both the industry and the university, there is an interest in educating world-class product design engineers that are capable of tackling the changing needs of context in terms of design, manufacture, and commercialization of new products. Some scholars, such as Rajasingham [1], Kaufman [2], Eder & Hubka [3], and de Vere, Mellers & Kapoor [4], have studied the phenomena of education in engineering by contrasting theory and practice in curricula that are structured for engineering and product design as disciplines. Thus, various universities around the world have promoted projects oriented to developing international experiences focusing on professional training, in order to enhance his capabilities. Likewise, some Colombian universities have developed similar international projects. Since 1999, Universidad EAFIT in Medellín, Colombia, is the only university in the country offering a Product Design Engineering (PDE) undergraduate program. EAFIT developed an international project in order to begin building “best practices” among students, alumni and faculty, and understand the evolution in the areas of design, manufacture and commercialization of new products in China in comparison to the Colombian reality. This project collects the experience lived by PDE students, alumni and faculty, taking into account their personal interests and the different contributions each can make to the beginning of a process of structuring these best practices in PDE education, and also their implications for Colombian industry.

The first part of the paper explains some antecedents of education in engineering and the role of universities in developing international projects that further professional training. Additionally, it contextualizes the Colombian industry’s concern for the promotion of strategies in the development of new products and how universities have supported this process. The second part describes the

international project's three phases: before (preliminary activities), during and after. At the end, some conclusions and results are presented.

2 BACKGROUND

Educational institutions –and more specifically universities– represent the main players in society transformation, because they train the future workforce and the leaders of tomorrow, setting “knowledge” as the primary production factor in the global economy [1]. This transformation is structured by the implementation of new learning strategies, the generation of and the implementation of different knowledge experiences, in order to become a professional more suited for the world we live in. It is now well known that learning has shifted from the mere transmission of information in the classroom, to providing relevant experiences in real contexts for the students themselves, as a way of learning through real life experiences and projects [5]. Within the design field, teachers and professionals are always concerned with the issue of industrial designers' capabilities [6]. There seems to be a gap between what students learn at school and what they are required to do in practice after graduation [2]. On the other hand, engineering teachers and practitioners are aware of the limitations of traditional teaching methods, which can focus excessively on technical knowledge, excluding other dimensions of product design education. According to Eder & Hubka [3], engineers should aim for the development of capabilities in both synthesis and analysis. Besides other categories of capabilities, personal, social and socio-economic competences are related to the link between engineering and the surrounding reality. In the current context, engineers must be flexible, creative and solution-focused with a strong ability to work in multidisciplinary situations [4].

Around the world, at schools like Swinburne University of Technology (Melbourne, Australia), study tours organized by the Faculty of Design provide undergraduate students with the opportunity to enrich their design education through exposure to new cultures and approaches to design. Students also find it is a great way to build international networks [7]. Similarly, Delft University of Technology (Delft, Netherlands) has offered study tours to students at their engineering schools to places such as China, Switzerland and Malaysia [8]. According to its director Erika Schnitter, the School of Design and Architecture in Latin America and the Caribbean – Isthmus (Panamá City, Panamá), offers a special trimester within the study plan during which students learn about the culture of a country interested in architecture and design. Students and faculty experience urban, architectural and design aspects of other cultures by developing previous capabilities in drawing, photography and ethnography which they can apply during their trip and their final results presentation.

In Colombia, since 2011 the industrial design program at Universidad ICESI (Cali) has also been carrying out international missions. Their main objective was to come into direct contact with the cultural and design atmosphere of Europe. They visited the Elisava School of Design and Engineering (Barcelona, Spain) and Javier Mariscal's (a Spanish designer) study. Meanwhile, Pontificia Universidad Javeriana (Bogotá) has international programs composed of “new territories workshops” in Bogotá and summer courses outside Colombia. Finally, Universidad de los Andes (Bogotá) seeks enrichment and updating of knowledge, diffusion of ideas and the establishment of new academic and cultural ties by sending students and faculty to international events.

Since the beginning of the program in 1999, the PDE program at Universidad EAFIT, have created a variety of academic projects (industry focused) in order to co-create products with the industry to have a better vision and a closer relation with the Colombian industry of the new product design process.

In recent years, Colombian manufacturing companies in the households industry like MUMA, Arquimuebles, Corona, Estra, Imusa, Haceb among others, have been generating and implementing strategies around new product development (NPD), which concern linking product design engineers and other professionals in the field in order to strengthen the NPD processes within and outside the company. Particularly, they have decided to invite renowned international designers such as Karim Rashid, Ross Lovegrove, Jorge Pensi and Javier Mariscal to launch innovative products in the Colombian and international market, with the purpose of increasing local and international visibility and promoting a new position and culture in the industry.

Currently, MUMA –a Colombian company founded in 1950 and dedicated to designing and commercializing furniture for different sectors, including educational, office, sporting and home facilities– has worked with product design engineers and highlights their communication skills, which were honed thanks to international exchange experiences during their formative years. The company’s design director, Pablo Naranjo, stresses that in some cases they turn into key professionals in various company areas and that (because they have acquired a broad design culture) they have supported the company in its process of internationalization. In recent years, MUMA has sought to open new markets, which requires designing products with global codes and languages. For this end, the company has worked with designers like Karim Raschild; with him, they designed and launched the “Juga” chair in 2012. They have also won international prizes, such as the *red dot design award* in 2008 (with the “Menta” chair) and more recently the *Lápiz de Acero* price for their “Wagon” line, a corporate furniture system. However, MUMA suggests that university and industry should join more in generating strategies for developing professionals in engineering that can deal with the demands of the international market.

3 THE “CHINA 2012” INTERNATIONAL PROJECT DEVELOPMENT COURSE

The “China 2012” international project was conceptualized by the PDE department at Universidad EAFIT. Students, alumni and faculty participated in its three stages: activities were held before, during and after the project. These activities included academic conferences and logistical activities and visits to design schools in China, manufacturing companies and the Canton Fair, as well as subsequent reflections and discussions. The project is explained in this following section.

3.1 Preliminary Activities

The project is structured as part of EAFIT’s School of Engineering internationalization plan. It includes a full academic semester of preliminary preparation with three main types of activities: logistical, cultural and academic (See Figure 1).

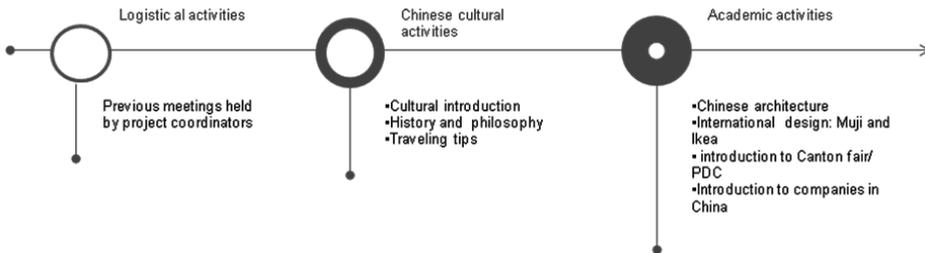


Figure 1. Preliminary activities

Logistical activities include the invitation to students and alumni, the selection of students and the organization of conferences for increasing awareness on the matter which had the approval and support of various academic and administrative divisions within the university. In total, 20 people participated in the project: 8 undergraduate and 3 alumni, 4 master students and 5 university professors (including 2 coordinators). In order to offer some cultural context for participants, Dr. Pablo Echavarría –Colombian ambassador to China in 1998– was invited to offer several lectures on Chinese culture, philosophy, history and other practical matters regarding the trip. The objective of these academic activities was to identify latent tendencies in different sectors of product design, manufacture and commercialization in Asia. There were four specific objectives: (i) To understand, by visiting universities, companies and fairs for two weeks, how China projects itself to the world, designing and manufacturing products that differentiate it internationally. (ii) To recognize the actual technologies used in the manufacturing industry by visiting companies that make different product categories. (iii) To identify design principles (understood as changes in design perspective), form-giving references and the application of new technology used for

creating the emblematic architecture of China. (iv) To understand the strategies behind international design companies, by visiting Ikea and Muji stores.

3.2 Through the Academic Excursion

Given the country's geographical extension, the selection of cities was done seeking to strike a balance between academic, industrial and cultural activities. Four cities were visited during the project: Hong Kong, Guanzghou, Shanghai and Beijing. Academic activities during the trip concentrated on three aspects: international design, visits to product design schools in peer universities and visits to companies in the manufacturing sector (See Figure 2).

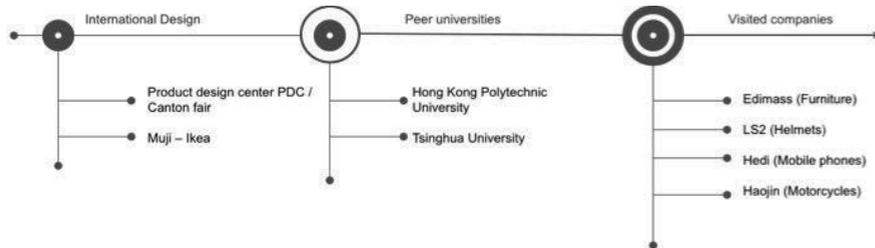


Figure 2. Academic activities for the “China 2012” international project

Regarding international design, the academic objective behind visiting the Canton Fair and specifically the Product Design Centre (PDC) was to understand how it works as a platform for design professionals and how can they offer their products to the world. Also, being at the Fair allows participants to understand how to create commercial and industrial networks that power their professional exercise. Additionally, analyzing business models used by international brands such as Muji and Ikea lets them size up the importance of globalization in PDE.

Meanwhile, two peer universities were selected for visiting: the School of Design at The Hong Kong Polytechnic University and the Academy of Arts & Design at Tsinghua University. These visits allowed comparisons between teaching and learning methodological strategies used by programs offered in Colombia and China, as well as the resources and infrastructure used in the education of PDE students. On the other hand, this first approach initiates the creation of work networks for international projects between programs and helps in establishing which are the factors that allow for the insertion of design engineers in manufacturing companies –this, in turn, helps in confronting the new challenges posed by a change of mentality that occurs in a society that goes from manufacturing products to designing them.

Another of the key strategies in the “China 2012” project was visiting four manufacturing companies in China: Edimass, LS2, HEDI and Haojin. Edimass is a company dedicated to designing and manufacturing modern and contemporary furniture for homes and offices. The company has been aware that it needs to expand its market and gain long-term sustainability. For this reason, it has employed American designer Sean Dix and commissioned him with the development of its own line of contemporary furniture in addition to their existing line of classical and modern products. Edimass is an example of the evolution of some Chinese companies –“From Made in China to Designed in China”– by establishing their own design department and by using a collection of international furniture as inspiration.

LS2 is dedicated to a different kind of product: motorcycle helmets. It is one of China's largest companies in the sector and its design department seeks to react to new markets by introducing new formal languages, materials and finishes. The innovations they have implemented in their manufacturing processes with composite materials and superficial finishes have allowed them to diversify their products and obtain better quality. The company has implemented a business model which was allowed them to grow as a brand with international visibility.

In the electronics sector, HEDI assembles and manufactures mobile phones and computers. The manufacturing processes used by this company integrate manual and semiautomatic operations. However,

it has expanded in the local and international markets by offering low prices in their products. Finally, at Haojin, a company designing and constructing motorcycles, the research and development department uses design methods that including drawing, 3D modelling, finite elements and rapid prototyping, aspects that are part of education in PDE and that allow innovation through its application to industry.

For product design engineers, contrasting and comparing the reality of Chinese manufacturing in such diverse product categories allows them to prepare themselves for the internal and external challenges of entrepreneurship. In this way, they can capitalize on their knowledge on the different technologies used around the world for speeding up innovation processes in companies. At the same time, they can compare the design process as they have learned it in their studies with the one applied in the industry.

3.3 After the Academic Trip

During the project and after it has been concluded, several reflection activities were done with participants. These activities yielded the following results for students and alumni:

- They experimented theory seen in PDE courses regarding design processes, manufacturing and commercialization of products in the Chinese manufacturing sector.
- They compared methodologies developed by peer universities to those seen during their own studies, making a diagnosis of which constitute good practices in teaching and learning.
- By visiting companies and the Canton Fair, participants understood the concept of China as “the world’s manufacturing company” by experiencing its manufacturing capacity and commercialization potential of its products around the world.
- Business simulations at the Canton Fair allowed them to learn about corporate and marketing dynamics for future business opportunities.
- The experience allowed alumni to validate their professional exercise and adjust their own practice to a globalized world.

Teaching faculty members that participated in the project reached the following conclusions:

- In order to educate world-class engineers, they should understand global problems, learn to be leaders and acquire new knowledge and methods that allow them to work with other engineers in the world.
- Strategic and relevant knowledge is not only imparted in the classroom by a teacher, but is also present in the experience students can live through international projects.
- Professionals must seek interdisciplinarity in globalized contexts, so that they can solve the challenges posed by engineering and design.
- It is an opportunity to compare and reflect upon the methods of teaching and learning that are used locally using an international frame of reference.
- Visiting universities and companies permitted a better comprehension of the ways in which they work to develop new products from research projects.

4 CONCLUSIONS

As we shown on this paper, other universities have piloted initiatives in favour of the students participating developing competences on internationalization of design, to understand the different markets, cultures and in general, the phenomenon of globalization that impact the design of new products. The approach of the international project presented here, differ from previous initiatives because the core of the idea was created based on a long-term strategy that seeks sustainable relationship between academics and industry in an emerging economy like Colombia. This project is one of the different efforts continually guided between Universidad EAFIT as an academic partner and the local design field industry in order to support preparing the PDE professionals of tomorrow that will design new Colombian products for a global market.

This project opened the mind of participants regarding their preferences in the field of design, product planning, design management, manufacture and advanced production processes in order to develop products with high added value. One important learning from this project, is to show how young PDE faculties could develop best practices in their academic curriculum that may include international experiences like the one presented on this paper and how this could bust students professional skills.

Social and technological changes in different parts of the world should be raw material used by universities as an input for their academic strategies. Preparing tomorrow's professionals requires continuous updating of curricula and opening up to experiences that transform the students and bring them to face world reality. Classrooms should not be the only stage in which they are prepared. Integrating research and development, industry and university is key for training world-class professionals.

The project offers new challenges for students. They can live other cultures and explore their design industrial and commercial processes. Universities in developing countries need to have clearer policies that promote students' international education.

The experience lived by participants in the "China 2012" international project –students, alumni and faculty– opens up new scenarios and challenges for those exercising PDE. Professionals in this area are conceived in an integral manner, as they study management, service design, manufacturing and new product commercialization. To keep up with the globalized world, professionals should be able to understand global design languages and other cultural and esthetical elements that are part of their work. Chinese industry is implementing design as a central axis in companies that develop new products with high added value. Product design engineers must become key characters by supporting Colombia companies' strategies in this internationalization model. Their education must seek to manage the new challenges faced by today's industry.

Technological transfer in areas such as manufacture and design can turn into a first step for Colombia industry to develop its own innovation methods.

Some limitations of the realization of this project included: an heterogeneous group with different professional stages (undergraduate, master students, alumni and professors of PDE) that demanded different project objectives and activities, language as a barrier of communication and most important, to make the participants conscious on how to appreciate and to make tangible the future application of learning outcomes in the professional exercise of the PDE.

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