



*grammes at the School of Design, where design research, either as a topic or a set of methods and tools, is now part of required courses, design studios and complementary or elective activities.*

*This paper first outlines in short the status of the School of Design of Politecnico di Milano, which has been formally integrating design research education within design curricula at the higher degree and Ph.D. level.*

*Then it pinpoints some criteria and conceptual frameworks that may flexibly shape the contents of an introduction to design research for novice students in the product design curriculum.*

*It finally addresses – from a personal perspective – some persistent difficulties encountered when exposing local higher degree first year students to a tentative generalized body of theories, methods and tools for design research.*

## Introduction

The Politecnico di Milano is a science and technology university educating engineers, architects and industrial designers through a variety of programmes. There are now three study levels: *Laurea*, *Laurea Magistrale*, Ph.D.

Milano has a long tradition in the practice of design, a profession dating back to the early years of the century, well based on local crafts and industries. It was Milano itself, with the Politecnico, that fostered the creation of Italy's first degree course in industrial design in 1993, exploiting the long lasting dialogue with the entrepreneurial and management tradition of the small and medium size companies and manufacturers of the local and national industrial system.

The recent history of the degree course in industrial design – which has now become the established School of Design – is marked by both consolidated and experimental teaching models. Since the beginnings the faculty engaged by this degree course has represented

a variety of cultures, merging the scientific and academic subjects stemming from design studies either in architecture and engineering. A relevant number of entrepreneurs, experts, designers from the areas of management, services and culture, as well as professional associations, often join the local academics and play an essential role in the educational programmes of the School of Design. Nine years after its creation, the School is now articulated into two campuses, in Milan and in Como. Some figures may outline the scale of the institution: about 4,000 students, with a coherent number of teachers, assistants, practitioners and experts who support full time academics.

## 3+2

Since 2004 the School of Design adopted a revised structure according to the readjustment of the Italian academic system. The traditional five-year degree course in industrial design – once representing the possible path for secondary school leavers requiring a professional education – has been reorganized in terms of subjects and purposes, in order to meet the new demands of the evolving social and technological system. The recent reform of the Italian academic system has led to the introduction of a number of new institutional elements, including:

- the degree and higher degree: the traditional five-year course has been split into two progressive levels, namely a three-year Degree and a Higher Degree of a further two years, shaping a structure now referred as “3+2”;
- university education credits: the system once based on yearly programmes is now converted into a system of university education credits (cfu, equivalent to the international credits Ects – European credit transfer system). University education credits are understood as units measuring the learning work, including the individual study demanded from a student. For the School of Design each credit corresponds to 25 hours of work. The average quantity of work associated with learning by a student on a full-time basis is conventionally established as 60 credits per year.

In the academic context of the discipline of design, the first level Degree (Laurea, 180 cfu) is expected to accomplish the general professional training and cultural education of junior designers. The second level Degree (Laurea Magistrale, 120 cfu) is expected to offer specialized skills in a particular area, or to extend the knowledge and skills acquired during the three years of the Degree programme, to complete the profile of an advanced designer [Fig. 1 → 227].

## 1. Designing Design Education

The present status and organization of the School of Design is the result of revisions and integrations of the traditional academic framework. Historically, the Italian university has been organized on the basis of a vertical division of knowledge with the educational pathway framed as a deductive process. Until very recently, in most disciplines academic education was organized in a linear and sequential manner, with theory and related knowledge representing the starting phases of the learning process and the technical and practical activities – the practice – deferred at the end of this process or, in some cases, to the very final phases of the curricula.

This system was revised when the recent restructuring of the academic system took place. Specifically, it has been assumed that it is not possible any longer to conceive forms of advanced education rigidly divided into compartments. Thus, the learning process is now interpreted as an inductive process, where theory and practice go side by side, with theory informing practice and practice being grounded in theory.

Current academic curricula in industrial design (first and higher degree) are expected to provide the theoretical, scientific and professional knowledge required by a practitioner for the design, manufacturing and improvement of products. The industrial product is not meant as a physical artifact only, but as the complex of factors aimed at communicating the product itself while giving it a sense (such as the aspects of graphic design and the design of brands, web sites, etc.).

The three-year first Degree programme is expected to form graduates who are design technicians, practitioners for all the technical duties required by product conception, production and distribution. The Higher Degree graduates are expected to supervise and define the strategic dimensions of design activities. These graduates are educated to be able to coordinate complex design activities, i.e. the creation of extensive and articulated product systems.

Those who have completed a Higher programme may attend a Ph.D. programme, the academic curriculum for advanced training in design research. The design area features a multifaceted Ph.D. programme (exploring the areas of product design, multimedia communication, interior design, design methods for product development, service system design, cultural heritage).

## 2. Design Research for Beginners

The Politecnico di Milano is a research institution and the School of Design operates under strict connection with the research units (Udrd) of the Department of Industrial Design (Indaco).

While at the first degree level (Laurea, articulated into the curricula in Industrial Design – Product, Communication Design, Fashion Design and Interior design) students are not specifically exposed to an integrated process of research in the very early phases of their curricula, the concept development and the testing of the design outcomes of their degree thesis is explicitly required to be based on the evidence of some investigations. Within the curricula in product design, the basic explorations informing the degree thesis project usually include data gathering, facts assembling or case study survey, and may include – to a very limited extent – usability testing, rapid ethnography, short task analysis, rapid user profiling.

At the higher degree level (Laurea Magistrale, articulated into the curricula of industrial Design – Product, Communication Design, Fashion Design, Interior Design, Furniture Design, Yacht Design, Service System Design, Design and Engineering) there are more effective opportunities to integrate the creative design process with

research activities, instilling a form of awareness of design research as a pre-requisite to a more formal approach to design research methods: at this level education in specific methodologies is reinforced by the more mature profile of a practitioner that students start to express. Starting from the first year of the higher degree level, our students are formally exposed to approaches to design research through specific courses, i.e. "Research Methods for Design", and through elective and complementary studios.

The complete first year of the two-year high degree product design curriculum is based on the following courses and studios: a design workshop, Semiotics, Communicating Design, Research Methods for Design, Strategic Design, History of Contemporary Art (for the opening semester) and Material and Technologies, Design Concept Studio, Project and Process, System-Product Development Studio (for the second semester).

The Research Methods for Design course contents vary according to the curricula (product design, communication design, fashion, interior design, system service design, etc.). These courses open a perspective on different ways to conceive research and to relate it to design, to encourage design approaches where theory, practice and research are integrated to sustain creative activity.

### 3. A Pilot Course

At the higher degree level, all first year students of the two-year product design curricula are offered the Research Methods for Design course, which was introduced in Autumn 2003 as a required. The Research Methods for Design course that I propose to the students (around 85–90 per section of the curricula in product design) is aimed at introducing students to the *idea* of design research.

Students engaged in this semester-long course are:

- provided lectures proposing an overview about developments around the idea of design research
- exposed to snapshots of research methods as well as case studies (ranging from ethnographic observation to immersive tech-

- niques, participatory activities, literature survey, case study gathering, scenario building)
- trained with various methods through short research exercises and assignments to gain simplified experience (rapid ethnography, user profiling, shadowing, product testing)

The introduction of non-specific and broad based design research methods, with an even distribution of attention to many methods, may contrast with some students needs and expectations to acquire more narrow-focused skills. Nevertheless, the intention of this course is to provide richer, although less specific, stimuli for innovative thinking and enlarged visions.

In its present form, the course is not a foundation course nor an introductory one: it is a first year course built around the need to encourage students' awareness of design research as a ground to inspire their creative learning. It is between a partial *grammar* of design research (some concepts, tools and techniques) and a partial *syntax* of the language of design research.

### 4. Tools for Reflection

As this course aims at introducing the elements of some design research methods while offering some points of reflection around the idea of design research, its contents are divided into two sections, namely "Tools for reflection" and "Tools in action".

"Tools for reflection" takes the form of a sequence of *ex cathedra* lectures and it emphasizes the role of definitions – either formal or descriptive – to clarify the dimensions of the context of design research. Here, I assume that definitions are not meant to settle matters once and for all [Buchanan, 2001, p. 8]: rather, they are critical to point at and suggest possible directions to be explored. The following list summarizes a flexible index of definitions usually to be argued through lectures during the semester:

- What's research and what's design research
- What's a design research methodology
- What are generations in design methodology

- What's scientific design
- What's design science
- What's a science of design
- What's a design research question
- What's a tool for design research
- What's quantitative design research
- What's qualitative design research
- What's ethnographic research
- What's human centred research
- What's action research for design

At the same time, while trying a tentative context for research for design, research about or in design and research through design, a selected number of seminar lectures serve at introducing entwined topics derived from three main areas of reflection:

- the discourse around design research
- user studies
- studies on designerly ways of thinking

These seminar lectures flexibly introduce some views on historical roots of design research [Bayazit, 2004; Margolin, 2002], generations in design methodologies [Broadbent, 2002], different forms of systematic enquiry [Friedman, 1999, 2000; Sato 2000, 2004; Poggenpohl, 2000], kinds of design research [Margolin, 1997; Hanington, 2003; Popovic, 2003], the design-science relation [Friedman, 1997; Gero, 2000], the designerly ways of knowing and thinking [Cross, 1982, 1995, 2000, 2004].

## 5. Tools in Action

At the same time students are solicited to approach a selected number of research methods. "Tools in action" is a sequence of further introductory outlines equipped with simplified instructions for guided exercises, proposing snapshots of research methods so to encourage the student active involvement in simplified techniques of:

- rapid ethnography
- user profiling
- interviews
- scenario building

- role play
- shadowing
- questionnaires/surveys
- opinion polls
- immersive experience
- lead user
- rapid prototyping
- usability testing
- think aloud protocols
- case studies

During the semester students are prompted to produce short exercises, tests, simulations, as well as carrying out two formal longer assignments, which usually take the form of a simplified ethnographic research for the re-design of a simple product and the analysis of a design research case study.

Although the course also explicitly includes the topics of action research and research on designerly ways of thinking [Cross, 2004], it is user-centred research that is becoming prominent for students. Indeed, the emphasis on direct interaction with people and their real life throughout their course activity, using simplified research methods coherent with to their daily context, is strongly encouraged. The prominence of methods derived from user-centred research or from user studies is motivated not only by the viability of some of these methods within the limited time and resources available, but it is the research activity largely favoured by students themselves and to be encountered in complementary classes, design studios and projects throughout their curriculum.

## 6. Filling Gaps and Missing Links

The need to articulate and maintain a sequence of introductory lectures within the course is motivated by the fact that although the value of design research is increasingly recognized and emphasized within the School of Design, we still face students whose idea of design research is definitively vague.

Although situated between an advanced beginner level and expert level as far as their developed expertise in design is concerned, higher degree students are still between a naïf and a novice level as far as their research awareness is concerned. This implies that most of them are in the transition from that naive state where they express interest in emulating conventional situations to a novice state where they start considering the featuring of a situation under expert guidance and follow strict rules to deal with it. To paraphrase Dorst [2008, p. 8] these students encounter design research as a formal process for the first time and to tackle its complexities they need to learn a whole series of techniques. But before that, I propose that it is an idea, a perception of design research that has to be transmitted to start their research expertise.

As a matter of fact, it keeps on being difficult for our local students – who are often familiar only with data gathering and fact assembling – to recognize that there are many kinds of design research and that research does not mean a single kind of activity [Buchanan, 2001, p. 17]. When reminding the important distinction of clinical, applied and basic research that is employed by universities as well as corporate and governmental bodies, it still keeps on being difficult not only for designers and design educators but even more for students to distinguish those kinds of research within the boundaries of design.

Such an indefinition also reflects the *status* of a local design research culture that is just now building a more consolidated identity. This is partly due to the peculiar background and the state-of-art of the culture of design research in Italy, where design has a long lasting professional tradition but no strictly formalized tradition in design research. Notwithstanding the history of Italian design and its cultural impact, national accreditation of the Ph.D. research programmes in design and the degree programmes (Laurea) in industrial design dates back to the Nineties. Thus, although consolidated in its vocational character, design is still in a formative stage as an academic discipline and a field of academic enquiry. Design curricula are continuously revised and innovative perspectives are just starting to be settled on the form and nature of formalized design research within and outside the academic context.

Further, I tend to agree with Hanington [2005] that many common perceptions still exist that impede the complete integration of research into the process of learning of our higher level students, as well as in the creative process of some designers. Most of these perceptions are founded not only in a lack of familiarity with design research and the opportunity to exploit its methods in general, but also in some scepticism on the effective extent to which research results may affect the design process as well as a reluctance to recognize that research may not only inform but inspire design.

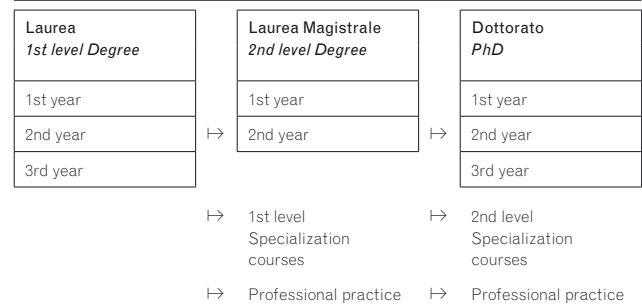
This is the reason why – when revising the course contents for forthcoming semesters – I tend to be more and more concentrated on questions like: how to convince students of the value and utility of design research? Why do we need to convince them of something that seems so self-evident for successful design? What is the missing link between design research and design?

These questions reflect the open debate focusing on one side on some resistance expressed by designers to integrate some kind of design research into their practice [Melican, 2004, p. 180] and on the other on those signs of a waiting-to-happen revolution in the design professions [Dorst, 2008, p. 8]. If it is true that a complete re-casting of the role of the designers through the adoption and incorporation of research into their professional practice is underway, why would a designer do research? What would designers need to know about research? How would that help designers design? How would designers develop actionable understandings of research results?

I have no robust responses at the ready. Rather, some preliminary, personal premises may clarify my view:

- the research approach to design does not contradict the creative and artistic aspect of design. There's no contradiction between the aesthetic dimensions of product values and qualities and the design research criteria that may inform that product. The main difference lays in the statement that it is the parameters of a design problem that may establish the basic requirements of a design solution;

- research methods for design may (and indeed should) transform the practice of design, not the core aims of design. Although a large number of leading designers use articulated problem-solving methods – but others are not concerned with how design is done in addition to doing it [Coonley, 2004, p.197] – and a growing number of designers, scholars and scholar-practitioners are active in the field of design research, it's the practice of design that is expected to change, not the objectives of design;
- a research approach to design does not contradict the role of intuition. Although we can not know what goes on the mind of a designer and we can not know whether a design solution emerges on the base of rigorous enquiries or through an unconscious process of selection of possible alternatives in the designer mind, intuition still remains there;
- finally, fully exploiting the potentials of research methods for design implies involving a rich relationship between theory and practice, between learning and learning-in-practice, between the conceptualization of our surrounding phenomena and the understanding of phenomena themselves along the designer ability to articulate that increased understanding as conscious knowledge.



**Fig. 1:** The 3+2 (plus 3) educational system. ↳ **218**

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