

AMPS Proceedings Series 17.2



Education, Design and Practice

Understanding skills in a Complex World

AMPS CONFERENCE 17.2

Education, Design and Practice – Understanding skills in a Complex World.

Stevens Institute of Technology, AMPS, PARADE, Architecture_MPS.

17—19 June, 2019

Education, Design and Practice – Understanding skills in a Complex World.

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AMPS PROCEEDINGS SERIES 17.2. ISSN 2398-9467



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INTRODUCTION

This publication is the product of the conference *Education, Design and Practice – Understanding skills in a Complex World* held at Stevens Institute of Technology in 2019. The keynote speaker was Peggy Deamer, Yale University. The call upon which the conference and this publication are based argues that:

The relationship between education and practice in any discipline is complex. In an ever changing world, it is also in flux. In a context such as the built environment, it is also interdisciplinary. Today, educators in the liberal arts still identify learning as an end unto itself, and designers still draw on ideas about intuitive knowledge. By contrast, the businesses behind urban development or city and regional growth call for graduates armed with the skills required in practice from day one. At the same time local government and cultural or city management firms need creative thinkers capable of continual adaptation. In the industries and sectors such as construction, transport and engineering, managers focus on a foundational baseline and value engineers and designers as both pragmatic problem solvers and visionaries.

These alternative perspectives have been reflected in multiple changes to the practice and structure of the education sector. One such example was the Boyer-Mitgang report which restructured architectural education in the US to reflect other professions. As in other areas, it resulted in a ‘degree arms race’, with MAs and doctoral programs multiplying more rapidly than the research and teaching methods they required. At the same time, the ‘widening participation’ agenda produced an explosion of research and funding for new pedagogical approaches and initiatives. Attempts to fuse education with the creative arts, industry and business through university led partnership schemes also proliferated. More recently, changes in the financing of the HE sector in places like the UK, mean universities now stress educational efficiency and guarantees of graduate jobs.

Working within this context, educators in sectors connected with the design, management and construction of the built environment have developed new and innovative ways to teach, they have embedded collaborative practices into their pedagogy, have forged unique partnerships across disciplines and outside the academy, and much more. However, research into best practice learning and teaching in the classroom is still evolving and educational initiatives can sometimes be seen as contradicting on-the-job realities in practice. The *Education, Design and Practice* conference publication explores this complex and contradictory scenario from multiple perspectives.

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TEACHING EXPERIMENTATION IN THE FIELD OF DESIGN: CROSSING DIGITAL TOOLS WITH ANALOGICAL ACTIVITIES

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METADESIGN AT THE SCHOOL OF DESIGN, POLITECNICO DI MILANO

This paper gives an account of an innovative teaching experience from the Bachelor's Degree in Interior Design, Metadesign Studio at the Politecnico di Milano, School of Design. It is a traditional studio that for years had a static structure, but during recent years, following the preparation of the Massive Open Online Course (MOOC) on the topic of Metadesign, it was decided to review the course setting and insert different elements of innovative teaching.

Metadesign at the School of Design is a fundamental pillar of all the various Bachelor-level design programmes. In the framework of a technical university like Politecnico di Milano these are shaped according to some central principles:

- Design is not just based on creativity and intuition but also on knowledges that can be transmitted in forms other than the atelier model;
- These knowledges come from the design field itself as well as from science and technology and from social sciences;
- The core of the design theoretical knowledge is based today on reflections, principles, methods and tools originated by the practice itself.

The main focus of the Metadesign studio is on the pre-project research phase: understanding the elements of the context (territory, market, company, stakeholders...), the needs of all the actors involved in the process, and exploring trends and opportunities, to generate new scenarios for concept development.

The design process is inextricably linked to all the elements of constraints and context that characterize the reality in which the product/service will be developed, communicated, marketed and used.

These are the contents of Metadesign and that's the reason why the first on-line course (MOOC) edited by Design School of Politecnico di Milano is focused on these topics.¹

METADESIGN CONCEPT

If we go back to the definition of Metadesign we can say that it is the design phase that leads to the formulation of the project concept through a research path that creates a synthesis between project objectives, technological and productive constraints, market context and consumption trends of the reference social communities.

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Μετά, in Greek, means through, after, behind, between. Over time it has acquired further meanings, such as besides, or beyond, or above, or "more general" that predates or reflects at a more abstract level on particular applications.

In the design field, Andries Van Onck (a student at the School of Ulm and later a professor of many generations of designers), was the first to elaborate a definition of "Metadesign" in 1964, meaning "initial speech", "more general" and "more abstract" and "the particular project pre-trial": "it's about the visual-formal language design" that can be adopted in a later moment to individual case needs.

Due to this methodological nature, Metadesign assumes an instrumental role along the entire design process: it determines the sequence of actions, "programmatically nature"; the action's contents, "what to do"; and the specific discipline to be applied, "how to do it".

The validity of this concept is originally based on the assumption of design as a scientific process, able to address contemporary complexity. Instead of the simple progressing by intuition, operational design methods allow complex problems to be processed by deconstructing them into more easily processed sub issues.

The modern movement in architecture and design contemplated the typical rationalist concept of considering design as a science; this ambition to achieve a scientific driven planning process, reached its full maturation in the 1960s and '70s.

In his 1962 *Introduction to Design*, Morris Asimow, Professor of the Faculty of Engineering at the University of California, developed a design philosophy that aimed to define the basic principles, the methodology and the criteria for evaluating the validity of the results. In this framework the term *Design Science* was first recorded. This was adopted by Buckminster-Fuller shortly after Gregory returned to it in 1966.

In the field of architecture, Christopher Alexander published notes on the synthesis of form in 1964 and addressed the problem together with other researchers of the constitution of a scientific environmental morphology.

In 1965 Bruce Archer wrote *Systematic Methods for Designers* in which, in addition to function and production, the market also appeared to be also closely linked to the concept of need.

In 1970, in *Design Methods: Seeds of Human Futures*, Christopher Jones described and synthesized from previous studies a set of thirty-five methodologies transferred from different disciplines; even in its various configurations the model of the design process that emerged from these and other studies of this period is sequential, and fundamentally divided into two distinct phases: the definition of the problem and the solution of the problem. The first phase has an analytical aspect in which all the elements of the problem are defined, and all the requirements are specified. The second synthetic phase is when the different requirements are put into the system in order to find a solution.

This apparently simple and objective model breaks with the crisis of modernity. These texts effectively testified to the climate of trust in science and in the method that characterized all project disciplines during this time.

Starting from around the seventies the methodological optimism has given way to reconsiderations and redefinitions of their field of application. This is based on the recognition of the non-scientific nature of the design process and of the impossibility of a design methodology capable of tackling design in an automatic way and, finally, of the acknowledgment of the sterility caused by the separation between methodological reflections and design practices.

Among the first to react to these excesses, was Christopher Alexander himself, considered to be one of the founders of design methodology. The crisis of the sequential vision of the design process as well as

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the recognition of the impossibility to divide the analytical and synthetic activities in a clear way, led to new, more complex, models.

In 1969 in *The Sciences of the Artificial*, Herbert Simon made a distinction between nature and artificial sciences, and, starting within this distinction, he expressed the need for a design science based on principles other logic, rationality and certainty, and inevitably methods typical of the Natural Sciences.

Nowadays we record a progressive shift towards more barycentric positions, within the dichotomy of design as art and design as science, in contrast to the idea of design as applied art or as science a third approach introduced by Donald Schon in 1983. This presents design as a reflective practice, which is the capacity of building theoretical and general knowledge starting from practice.

This particular attitude is actually current with the general need for research and educational institutions to continue with function based on their traditional deductive approach, first theory and then as a logic consequence practice, to be able to better face the complexity of the real world.

Thus, the importance of reasoning as to how to form this new figure of the reflexive professional emerged, as well as considering the ways with which to form, stimulate and combine practical activity and reflection on action as the basis for generating new knowledge in the field of design. A vision of design emerged that is capable of producing knowledge through its own ways, which do not necessarily follow the scientific ones. In this way design research assumes a phenomenological perspective that observes the reality of the project in order to derive general rules and principles that continuously evolve together with the adopted point of view and the reference context. It is a vision of design as a thoughtful practice that elaborates and codifies new knowledge, starting from a professional action; the codification of a tacit knowledge based on experience.

To conclude, Metadesign today has abandoned its aspiration for a unitary methodology to assume a fragmented and heterogeneous configuration. Making Metadesign today means working on dimensions that are often purely subjective and qualitative, looking for complex and articulated identity projects and working on differences and specificity rather than purely quantitative and standardized parameters. This contemporary idea of Metadesign is enriched with cultural and emotional values in addition to the quantitative and rational values of the system.

Nowadays, Metadesign maintains its key nature as a theoretical and methodological approach to design practice but also plays an important role in some application fields, characterized by the shift from the design of the single project to the design of a project family.

INNOVATIVE TEACHING: NOT ONLY MOOC

There are historical moments in which the role of education systems is not simply replicating the existing social system but creating the conditions in which new worlds can be invented. When we propose a rethinking of the aims of education, we cannot help but reflect very seriously again on its methods and its styles.

We must engage in the learning experiences of which we are the protagonists, observe them with more awareness, and redesign them to make us be inspired by the great wealth of pedagogy, but also of the opportunities of the digital world to create classroom realities that are increasingly active, collaborative, creative and, above all, more and more effective.²

Innovative teaching requires that, in addition to gaining knowledge of the subject, students are also provided with the tools to maximize their acquisition, expression and implementation in their professional life at the end of their studies.

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Going beyond the content means to combine traditional teaching, all those methods that facilitate learning, and to use codes and tools that are part of the methods of communication and expression of the students.

What are the transversal competences that can help students optimize their learning and memorization methods? What are the skills that can differentiate a recent graduate in the world of work and give greater impetus to her career?

Where to start to innovate our teaching? But, first of all, what does it mean to do innovation in the classroom?

Starting from the first MOOC focused on Metadesign edited by the Design School of Politecnico di Milano, the teachers of one of the Metadesign studios decided to innovate the studio format, adding off-line activities linked to the MOOC content.

“Introducing Metadesign” is a three-week module with a methodological soul. The goal is to present all the design phases: reflecting on them, organizing activities, and explicating every cognitive step with the aim of finding, developing and internalizing one’s work method.

The “Introducing Metadesign” stems from the need to transfer a methodology, a consolidated research practice able to support the design process. The design process is inextricably linked to all the elements of constraint and context that characterize the reality in which the product/service will be developed, communicated, marketed and used. The course structure foresees the reconstruction in phases and successive elaborations of all the elements of context that come into relation with the object of the design process (product, space, service, communication artifact...) influencing its characteristics and creating the “platform” of elements that make its development possible. The set of contextual elements is the scenario on which the construction of the design brief is based, that is the explanation of all the elements that contribute to define a new product. This is not the result of a deterministic vision of design as a direct consequence of the elements of context — production, resources, market, context of use — but the formalization of a practice that in the Italian context has historically fueled the ability to continuously and constantly innovate. Design research thus becomes the tool through which the awareness of the system of available resources is built by creating an organized knowledge platform, a Metadesign, which already contains all the elements defining the product.

The course is divided into three weeks, each one examining a specific topic in depth: an historical and context analysis; an overview of tools and the process of Metadesign approach; and a final exploration of practical applications of such approaches in different fields of design, from fashion to cultural heritage, from products to interiors. Each week is divided into short lectures, bibliography and additional materials, a weekly quiz and a being active section.³

CROSSING DIGITAL TOOLS WITH ANALOGICAL ACTIVITIES

The Studio aims to teach a path through which the students are guided to the acquisition of specific knowledge for the design process, as well as for learning and experimentation with tools and techniques for reading, interpretation and ideation of specific spaces of use.

This path is focused on the places linked to the design of hospitality in relation to a sequence of different "points of view" from which to look at the genesis and evolution of some types as well as the emergence of innovative typologies.

The students will be introduced to an understanding of the dynamics that invest the spaces for accommodation (from the historical evolution to the typological analysis; from the study on trends to

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paradigmatic case studies) to then arrive at the construction of a "concept" of the project in a specific context of the city of Milan. In particular, it deals with the design of hybrid spaces, between the spaces of low-cost housing and spaces dedicated to study and work.

The workshop activity is supplemented by a series of contributions from external guests regarding the issues concerning Metadesign.

The studio had maintained a static and traditional structure for years, consisting of:

- (a) lectures
- (b) reviews of different groups of students who carried out the project of designing new formats of low-cost hybrid housing (eg hostels + student residences) in existing structures in the city of Milan
- (c) study of the bibliography, evaluation through a written test.

Starting in the academic year 2018-2019, the course also includes an innovative teaching component, delivered through the "Introducing Metadesign" MOOC (d), specially set up for the Metadesign Studio and described above. The general indications for the students were to appreciate online content and independently explore the specific topics covered by the videos.

The teachers of one of the parallel sessions of the Metadesign Studio decide to review the course setting and insert different elements of innovative teaching, consisting of:

- (e) classroom exercises on the content of the MOOC
- (f) short lectures and assessment of the content of classroom lessons via clickers
- (g) collective presentations of the project work
- (h) comparison between the MOOC content and the design path carried out by each group.

In particular, the first week of the MOOC focused on the analogical activities and the theoretical aspects of Metadesign. The class was always split into groups and the teachers asked the students to discuss the video topics using other materials to support their thesis, e.g. books, texts, images, information. During the first activities the teachers gave the materials to the teams and asked the students to research and highlight the most interesting references to discuss with the other classmates. One of the most interesting aspects of these activities was the debate generated by the students themselves.

During the semester six activities were carried out in class relating to the MOOC, through which themes and aspects presented in the videos the students had viewed at home were studied in depth. The size of the groups varied with each activity, sometimes smaller and sometimes larger. The last exercise also linked the MOOC issues with the space project dedicated to a low-cost housing service carried out by students during the studio.

The digital tools support the teaching activities, but they are not enough without a structured set of activities focused on collaborative learning. The engaged-learning activities are unique in that they rely on collaboration amongst peers and lend themselves well to collaborative/group-learning opportunities. Studies have shown that students who meet in learning groups at least once a week show significant improvements in learning (Marzano, Pickering & Pollock, 2001).

The analogical and digital mix was certainly a strong feature to carry forward in the coming years. The relationship between MOOCs, classroom activities and project development should be strengthened with the common aim of enhancing the skills related to Metadesign, its history, its tools and its processes.

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