Connecting training and design processes: Definition of an effective model for design training[1]

Conectando formação e processos de design: definição de um modelo eficaz para treinamento em operações de design

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Abstract

Attentive considerations on the value of research in design in terms of producing and promoting knowledge within the innovation processes bring to light the necessity to create a multidisciplinary action model, able to correlate with transversal skills and with the system of values and culture that characterizes the settings where research centers, training centers, businesses and institutions operate. The tested model proposed is a workshop in which the actions of research and training are able to perform, simultaneously, through design tools. This has resulted in the construction of a community of institutions - universities, businesses, government agencies - where research and training have become opportunities for discussion for all involved parties. Furthermore, whenever possible, through experimentation and continuous exchange of ideas, new scenarios can be put together as a result of sharing experiences and skills in a mutual and continuous learning process. The model – workshop finds its justification in the desire to redirect the paths of research and training for design in a single open container, capable of creating strong links with the territory and outline a continuous offer both in terms of training, production and dissemination of skills.

Key words: training, territory, research, innovation, contemporary action.

Resumo

Considerações atentas sobre o valor da pesquisa em design em termos de produção e promoção de conhecimentos no âmbito da inovação de processos trazem à tona a necessidade de criar um modelo de ação multidisciplinar. Este modelo é capaz de se correlacionar com competências transversais e com o sistema de valores e cultura que caracteriza as definições em centros de pesquisa, centros de formação, empresas e instituições operadoras. O modelo testado proposto é um workshop em que as ações de investigação e formação podem ser realizadas, simultaneamente, através de ferramentas de design. Isso resultou na construção de uma comunidade de instituições – universidades, empresas, agências governamentais – onde a investigação e formação têm oportunidades de se tornar a discussão para todas as partes envolvidas. Além disso, sempre que possível, por meio da experimentação e do intercâmbio permanente de ideias, novos cenários podem ser concebidos como resultado da partilha de experiências e competências em um processo mútuo e contínuo de aprendizado. O modelo workshop encontra a sua justificação no desejo de reorientar os caminhos da investigação e da formação para o projeto em um único recipiente aberto, capaz de criar laços fortes com o território e delinear uma oferta contínua em termos de formação, de produção e difusão de habilidades.

Palavras-chave: formação, territórios, investigação, inovação, ação contemporânea.

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Innovation through training

Despite today's opportunities to innovate in all areas of production that characterize the Italian economy, as it happens in other areas of excellence that represent "Made in Italy" worldwide, Italian chains in this sector record a steady loss of competitiveness on the international economic panorama, due to their poor inclination and unreceptive attitude towards innovation. The causes of innovation difficulties that afflict our businesses, and the failure to initiate appropriate policies in this regard are compounded by the inability to implement immediate or short term innovative processes, not to mention the time required to configure worthy and creative processes that would lead to a strong focus on product innovation, services and processes for the enhancement and growth of the production sectors that characterize the Italian economic system.

Research and innovation topics are continuously reproposed and recently, even more so, as designers seek a solution for the continuing economic crisis that particularly affects business of know-how. In addition, the result of a lack of "innovation phenomena", as Luigi Nicolais refers to it, is a generalized crisis of all production areas that characterize local or regional economies.

The Italian system is composed primarily of small and medium enterprises which are unlikely to converge towards strategic and shared actions of growth and development, and the aggregation of small and medium enterprises has always been characterized by an indissoluble bond with the territory and the system of local factories.

In spite of the connections between territorial and environmental factors, not only do businesses fail to share experiences, expertise and resources, but also they sometimes ignore the "unexploded" possibility and potential of an integrated system of factories and of the exploitation of resources belonging to the territory. Therefore, the starting point should be the territorial capital which needs to be promoted to enhance the set of historical, cultural, environmental and artistic resources and capitalize on the traditional high quality handcraft knowledge and skills that merge into the production sectors related to the territory. The appropriate evaluation policies must be determined by the assessment of territories related to companies that specialize themselves in "made in Italy", and that are responsible for our image in the world, and, more specifically, for the enhancement of the local production systems, starting from a reinterpretation of design actions aimed towards a reconfiguration of new creativity and innovation tools.

It is through "tactical design" that a convergence between different skills is possible. What is more, it is the means to generate innovation from the acquisition and sharing of new knowledge and new skills. This would encourage the adoption of a common language that ensures a continuous exchange of information. Innovation, in this sense, should generate confidence, dynamism and authority among businesses, to allow greater competitiveness.

Creativity summarizes the skills and capabilities of design and innovation, as well as product quality that derives from undisputed "know-how", the quality of materials and techniques used in the product manufacturing, characterized by secular handcraft tradition.

If the goal is to exceed the creation of economic products based purely on quantitative parameters, then creativity should be the propelling force behind an integrated system of activities and services produced by an idea, starting from local resources in an integrated strategy between different production systems. The implicit quality of local production systems should be enhanced through an integrated system developed by public and private actors, through the promotion of shared research, innovation and design activities for the development of new products and quality services in different areas, and also through communication, customization, certification and traceability of the product. The final objective is to test new models and tools to optimize the production systems that will be implemented in synergy with the system of local enterprises and institutions to promote creativity, innovation and competitiveness of the local industries. These opportunities for synergy between research facilities and businesses, sometimes even internationally, are the prerequisite to trigger "actions from the bottom", with the involvement of the basic and local identities, in order to guarantee a community that is conscious and aware of the measures that need to be undertaken. For this reason, it is necessary to work for the construction of an indissoluble link between the world of production and that of education and research.

Innovation time frames are very long and it is extremely important to meet the innovations requirements rooted in our territory and country, in institutions and in the system of small and medium-sized companies that struggle to sustain economic growth. Hence, to reduce the time of innovation and to encourage attitude towards our system, it is important to insist and to accelerate the process so that university training is able to take responsibility in meeting the needs of innovation in order to promote the necessary coalition of businesses, institutions and research. The objective of setting up a community of designers, researchers, trainers and entrepreneurs is formed independently and voluntarily to do practical work, to create new knowledge, to build new identities and, finally, without improvisation, to create a reality of common practices.

The multi-thematic overlapping workshops[2]

The structure of this proposal is a result of various considerations on the role of research in design, intended as a producer of knowledge in relation to innovation processes, different parties and their roles, and to the

system of relations which time and again is established within these processes.

According to De Biase (*in* Gambardella, 2009, p. XI), if it is true that today

"the dynamics of innovation is the force that can shift history towards an improvement of living standards [...] [then it is also true that it can not be a linear dynamic experience, and it cannot be described as a simple succession of causes and effects [...] or as a part of an ideology that can be rationally or completely defined. It is an array of human, cultural, technological, scientific, economic phenomena not measurable as a double entry [...] an ecosystem in which each element is connected to every other".

Within this "ecosystem", a major role is assigned to knowledge,

"in a knowledge-based economy, goods are produced using knowledge as the primary fundamental factor. Knowledge is used in production processes and also as an independent factor, in the form of knowledge provided by people, as well as by objects and services that contribute to the productive outcome" (Rullani, 2004, p. 100).

The ability to create awareness and to use it in the best way is, without a doubt, one of the factors that determine the development and prosperity of an area, so that the area becomes, as evidenced by Rullani (2004, p. 100), a "cognitive multiplier" able to contain and propagate all knowledge including implied knowledge,

"which in its propagation, requires a network of areas (territorial systems) on which to rely. The areas organize the complexity in a steady, durable way: since the organizational strength and identity of these areas allows the flow to be flexible, experimental and swift in the propagation process".

In order for areas to be able to generate and disseminate knowledge for welfare and development, they need the presence of one or more generating systems and of an environment that encourages the disclosure processes, but the mechanisms that allow both circumstances to exist are not always clear and replicable. In the so-called "cases of excellence"[3], there is an overlapping of factors such as creativity, ambition, curiosity, willingness to find shared solutions as well as the social and environmental context, method, tools, the network of relationships, infrastructure and its available resources, which are all crucial for the establishment and development of the innovation process.

As De Biase (*in* Gambarella, 2009, p. XI) states,

"the animal instinct of the innovator, investment in research, training costs, the flexibility of the workforce, the amount of capital, creativity and imagination, are all important factors for the ecosystem of innovation".

Crucial for the achieving of this result is the relationship between research centers, businesses, institutions and the cultural and values system of reference that characterize the territory. An important point within this relationship is the investment and the quality of research and training.

When taking into account research activities, it is generally accepted that, except in rare cases, these do not represent an investment - with a short term return - for the industries. As discussed by Gambardella (2009, p. 37),

"one of the reasons is that research, more so than development, generates benefits that go beyond those that directly affect the entity that creates it. Basically, all parties involved want to gain more but would like someone else to do the work so as to benefit without paying for the cost of the investment. [...] For this reason, research must be publicly supported. People or institutions, that are doing research for other purposes rather than for profit, are needed. In that regard, Kenneth Arrow speaks of a historical "fortunate accident" to explain that there are people who combine research with other activities such as teaching. The community of scientists and researchers operates on a different set of rules than those applied by investors who seek economic returns [...] Whatever the purpose, the point is that their motivation to do research is not hindered by the fact that their results may effect others.

We cannot afford to run the risk of excluding investment policies - in a system of government aimed at competitive development of the territory in all its forms - the centers and organizations delegated to the training and production of knowledge. The organization of scientific research indicates the only possible route to acquiring new knowledge. Its relationship with innovation, as underlined by Buscema, is similar to the "spoken and written language of every culture: research finds new lands and innovation builds roads and bridges so that everyone may live there" (Buscema and Pieri, 2004, p. 19). It is easy to see why it represents a key resource for the development of a territory.

Therefore, investing in research in all its forms as well as in training, in turn means a continuous cycle of creation and transfer of knowledge from the theoretical-experimental field to the applied field, using and improving resources, local vocations and talent. It is an open and complex course, characterized

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[3] It seems appropriate to consider the interpretation proposed by Hauser, who recognized the variables that characterize the dynamics that generate innovation in the social cultural and environmental aspects "we do justice to the institutional, cultural, cognitive and emotional dimension of innogenetic behaviors; a change necessary to comprehend innovation in an economy in which the immaterial aspect has overcome the material one" (Viale *in* Viale, 2008, p. 2). Some areas or places present for cultural reasons a higher inclination towards risk or a more attentive attitude towards the elaboration of outside incoming signals, a predisposition for generating, knowledge, innovation and they are, therefore, defined innogenetic. In view of such contexts, the complex phenomena of innovation should be approached taking into account a series of psychological, social, cultural and institutional factors.

by transdisciplinarity and a continuous exchange of knowledge and different skills, both decipherable and implicit, even with the outside world, with a desire to move away from strict academic rules.

Moreover, as suggested by John Ziman, "science has entered a new phase, a post-academic phase, characterized by the blurring of clear distinctions between science and technology, between pure and applied research, with stronger emphasis on the political and economic institutions at the expense of the academic ones" (Nicolais and Festinese, 2006, p. 111).

In Italy, and, especially, in the regions of the South, opportunities for a relationship between design universities and the world of industry have had, in rare instances, moments of sharing, that include research and training, and as Bertola and Maffei (2008, p. 17) say,

"the mature debate on contemporary economies as economies of knowledge has led to increasing emphasis on the processes that are able to support the transfer and development of new knowledge. Training and research in science and technology are levers that allow the reproduction of these processes. The production of new methods, tools and strategies for developing training and research is, therefore, a work priority".

In this scenario, the role of research in design, because of its transdisciplinary nature, and because of its link with the industrial world, and thanks to the design approach of this discipline, takes on a fairly defined position. According to Bertola and Maffei (2008, p. 31),

"[...] in today's world where everything changes so rapidly, an increasing number of individuals and collective groups are confronted with new problems and opportunities never before experienced. There is an obvious demand for skills and expertise in design; a discipline able to dialogue with all sectors involved in the development processes through a methodology that allows a continuous comparison".

The creative and transverse approach to design involves the development of strategies applied by both the world of industrial production and that of research. In this context, the local dimension deals with the global system through a permeable connection between nodes - an active and controllable system capable of generating goods and services of international importance, with close connections to the local territory.

Based on these considerations, transverse multi-thematic workshops are proposed as spontaneous aggregations of universities and enterprises. The main parties of the innovation processes play in a dynamic network of relations and exchanges for territorial development that is able to engage local government agencies. Consequently, an open "ecosystem" is created, in which the three agents of the "triple helix" (Etzkowitz, 1997) cooperate and act, in order to achieve a series of objectives designed to develop design research projects, and multidisciplinary training, crossing the boundaries of the district associations.

So the areas, intended as generators and connectors of cognitive streams, create a system of networks both within and between them, where each meeting point is characterized, at the same time, by permeability and adhesion. These areas, as Rullani puts it, "act as a spring, which allows the local realities to make that leap to the global realm [...] sites crossed by the trans-local knowledge are no longer isolated systems, they become pieces of a new kind of open mosaic" (Rullani, 2004, p. 101).

The structure is created so as to identify continuous moments of contact between the actions of research and training, through processes that belong to the culture of the project. By intercepting a specific request, a grouping system, on the territory, anticipates the needs, simplifies the steps to transfer knowledge, for decoding, for destruction and recodification of implicit and new knowledge and through a creative process conceives new offers for an international scenario. Furthermore, the functionality of the model is directly proportional to the level of interaction that the parties are able to establish with the territory and among them. Strengthening a collective identity, in this regard, means to be confronted with international situations through the exchange of knowledge and skills and thus opening the doors to change while remaining faithful to one's cultural frame.

To ensure that this model is faithful to the territorial context to which it refers, it is important that a relationship of trust is established between the production firm and the knowledge creation groups of the area. An open, tolerant, and creative relationship, in which the mutual exchange of knowledge is constant and synchronizes the individual capacities enhances the local resources and learns from international experiences in favor of territorial development. These are the aspects that the laboratory intends to apply on with the goal to invest in territorial talent and vocations.

The workshop model here proposed is the result of a desire to channel the two paths of research and training into a "friendly" and open container that is able to create strong connections and a continuous offer, both in terms of education and knowledge.

The first action consists of creating a network that finds its inspiration in the structure of the community of bodies, a type of aggregation that starts at the bottom, that can be integrated and improved, and that is open to any comparisons or collaborations with international groups. The configuration of the community of bodies, as underlined by Nicolais (in Maccacaro, 2007), taking example from a model theorized by Lave and Wenger (1991), is derived from the continuity of the relationship between companies that insist on operating in the same territory, that share the same objectives and are characterized by a strong sense of trust, with an identity that is formed from the bottom up. To ensure matching dynamics, it is necessary to build – first of all - a relationship of mutual trust.

From an operational point of view, the role of universities, in this first phase, is quite central, since they have the responsibility to demonstrate, through the creation of projects a strong response to reality as well as the possibility of achieving results through the tools of design research in terms of product innovation, process and training.

To this aim and because of the nature of the discipline, it is necessary to identify the platforms of

cooperation, even between different academic realities. The results will represent the shared efforts of several skills through a trans-disciplinary action that requires cooperation and integration.

The projects are structured according to a collaboration carried out in the form of multi-thematic research and training workshops for students as well as employees and entrepreneurs. All parties involved develop together, with the intervention of external specialized persons, the entire route, from the definition of the solution to the implementation and prototyping of the product, with the identification of additional opportunities for future collaborations.

The creation of a network connection between companies and different academic realities on the territory will allow the activation of a system of relations, involving skills and production realities of different natures. This will facilitate the construction and integration of a space for collaboration to identify development opportunities, areas of research, design themes, areas for process and product testing. Therefore, an order designed to overcome the spatial and territorial dimensions, and enable a prompt response to the requirements and changes that come from the outside.

The goal of the network will be to facilitate the circulation of knowledge, ideas and creativity among involved parties, and at the same time, create a system of shared innovation, intended to provide quality research and training, and to introduce an innovative research-training system. In such a manner, a flexible and dynamic system would be established, where the involved parties discuss and decide together how to resolve any arising issue, to create a shared project and then separate and join different networks to achieve new goals. The constant element, in this case, would be the academic institution which in fact has the role, from time to time, of identifying a network of expertise in response to specific requests from different businesses.

Another objective is the enhancement of creative resources, through a continuous comparison both internal to the laboratories and internationally.

The presence, on the territory, of a connection with the industry, could be, for the universities involved, a stimulus to configure design methodologies that have, as a purpose, not only the implementation of the scientific or technical knowledge but also the support of individual talents and territorial vocations, through continuous experimentation of creative processes and transfer mechanisms of knowledge, crucial to the culture of the project.

A continuous laboratory where it is necessary to channel various skills, from those of a technical nature to those of an economic nature requires the inclusion of specific professionals in the management of group work and in the creative process.

The presence of different disciplines within the laboratory effectively realizes the training objectives, which not only concern students, but also professionals within the company - from entrepreneurs to workers – who have the opportunity to experience and understand the dynamics of the creative processes.

The configuration of continuous overlapping multi-thematic workshops also represents an opportunity for universities to assess the actual validity of a project, through measurable results and an immediate comparison with specific skills. This would also help students in training, because they would have the opportunity to take part in the whole process of product development up to the configuration of the prototypes. In addition, for the companies this could provide a competitive advantage because of the continuous presence of cultural resources, which would become an integral part of the business processes.

A final consideration must be made on the time variable, "the problem of time in the development of new products has dramatically emerged in the last decade [...] production needs long periods of time to resolve conflicts between the various activities and stages that intervene on the resources" (Collesei and Vescovi *in* Nicolais and Stampacchia, 2001, p. 32). The reduction of development and marketing time of a new product has greatly influenced the evolution of the industrial processes, "having moved from a first generation of sequential and linear processes to today's generation of processes which involve the performance of several parallel and integrated activities" (Rampino, 2004, p. 219). The transformation of the approach from a sequential process to "parallel engineering" (Blackburn, 1991) has made the process of simultaneous activities possible, reducing the total development time, so as to permit "parallel progress of product ideas that are refined as more and more information is shared among teams of Research and Development, Engineering and Production, and Marketing and Sales thus defining market conditions, technology and production of the new product" (Collesei and Vescovi *in* Nicolais and Stampacchia, 2001, p. 33).

Similarly, the concept of simultaneous research and training actions, here proposed, together with simultaneous development of a research project and the ongoing confrontation between different areas, would allow a reduction in time, because the information is shared, "in organizations that want to increase the speed of development of new products, an *information redundancy* is necessary, that is to say, a situation where an excess of information is shared in addition to the sufficient minimum required by each individual, group, department, involved in a process or function. The information redundancy helps to clarify the information owned by each organizational unit and stimulates the generation of additional information" (Collesei and Vescovi *in* Nicolais and Stampacchia, 2001, p. 33).

The overlapping multi-thematic Workshops' model results in a friendly and creative environment, in which subsystems circulate, and that, from time to time, unite in a spontaneous order to achieve common goals. Information sharing, a continuous comparison, and the use of processes to transfer knowledge, to generate and to manage creativity are the constants for the conduct of research in design as well as they make these environments flexible to accommodate the new sub-systems and generate new knowledge. The establishment on the territory of multi-thematic workshops, where agents and the processes of research and training blend in, involves a detachment from strict academic rules in favor of innovative models in line with modern ideas on the role of universities in the development of territory, and also involves the need for a renewal of the Italian academic system. A renewal that, especially for

research in design, and because of this discipline nature, cannot be separated from the production process along with the constant comparison with territorial vocations.

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