IV JORNADAS INTERNACIONALES
SOBRE INVESTIGACIÓN EN ARQUITECTURA Y URBANISMO
4ᵀᴴ INTERNATIONAL MEETING
ON ARCHITECTURAL AND URBANISM RESEARCH

1

Building Knowledge by Design

Richard Foqué

Em. Professor Ordinarius
Henry van de Velde Higher Institute of Architecture, University of Antwerp, Belgium

Abstract*

The professional disciplines are the connectors between basic science and the real world, and between theoretical concepts and practical applications. They reduce the gap between real world problems and academic research. Important here is that the professional disciplines develop their own bodies of knowledge and methodological frameworks. By doing so they may become the initiators of a new intellectual attitude.
Professions such as law and medicine seem to have a growing, reliable and robust knowledge base upon which to guide actions and take decisions.
The architectural profession, for some reason, does not have such a knowledge base or, at least no longer.

For more than two thousand years, the discipline of architecture built a growing comprehensive and professionally acknowledged body of knowledge. How did we lose that tradition? Why did we stop building on this legacy?
There are many reasons, including growing emphases on variety and uniqueness, and the increasingly autarchic and individualist attitude of the architect himself. But the modernist movement has certainly played a decisive role in this as well. By considering architecture as a means of creating a new world, it conferred a lot of emphasis onto the socio-political role of architecture, and in the process the architect became an agent of social change, somebody with a mission. This vision gave raise to the individual architect, whose design activity should be driven by innovation and creation of novelty, leaving no room for tradition or interest in studying what came before.

Professional practitioners tend to operate individually or in small teams. Despite the fact that the differences between these professions may be gradual, they rarely share their knowledge on a global scale as do scientists, nor are they likely to submit their experience to extensive peer review. The architecture profession in particular suffers from this phenomenon. Within such a situation, it is difficult to build a common understanding of what best practice should be, let alone to build the solid body of knowledge, so necessary to providing the profession with a much needed scientific grounding.
With respect to that, Jarvis (1999) points to the fact that many practitioners undertake their own research as part of their professional work. Unfortunately, this means that much of it does not get incorporated in their profession's body of knowledge. As in many other professions, especially in architecture, most of the knowledge is generated and legitimatized pragmatically instead of being logically derived from theory.

4 I i A+U

IV JORNADAS INTERNACIONALES
SOBRE INVESTIGACIÓN EN ARQUITECTURA Y URBANISMO
4TH INTERNATIONAL MEETING
ON ARCHITECTURAL AND URBANISM RESEARCH

2

On the other hand it is widely known that professional schools within research universities privilege a systematic, preferably scientific, approach. Within this context architecture occupies a somewhat different and unique position. Since the emergence of modernity, architecture finds itself in an ambivalent situation. Considering themselves as practitioners of a "creative" profession, they hover between science and art.

Since the Enlightenment we see a growing methodological separation of art and science, and by doing so a reduction of knowledge to rational thinking. Subsequently, over the past century technology, as the product of scientific theory, has become the dominant agent in cultural evolution, a driving force and value-standard setting.

In fact both art, science, and technology can be seen as a mean by which man can understand, intervene, change, model and structure his environment. He is acting then as a "designing-being," whereby designing is defined as the activity to transform human space into a new and structured reality. Where science aims at finding the truth, art is said to aim for beauty. In that sense, it is considered neither measurable nor able to be described in objective terms, but instead is tasked with generating an esthetical experience. It should appeal to the different human senses, stimulate them while engaging them in a mind-expanding dialogue. Despite the fact that the scientific method tries to be rigorous and exact, the criteria for what is a true fact are not always clear or evident, and the criteria for beauty are even more indistinct.

Design thinking is per se innovative, heuristic and experimental, driven by empathy and focused on problem solving. It essentially deals with problems with multiple stakeholders and fuzzy boundaries, and where the solution is found between disciplines. Therefore designers should bring to the table a broad, multi-disciplinary spectrum of ideas from which to draw inspiration.

Where scientific inquiry tries to answer the question how things are, design inquiry tries to answer the question how things could be. Both challenge the physical world. Art, on the contrary, transforms reality by giving it new meaning, raising the physical to the metaphysical.

Scientific research is based on the testing of a hypothesis put forward in the form of an explanatory model. In art, testing a so-called hypothesis is senseless. The essence of the design inquiry, on the other hand, aims to develop in parallel as many hypotheses as possible, not on the basis of exploratory models but of exploring ones, models with probing capacity. Testing seeks to identify the most desirable result. It is at the same time an optimizing, judging, and subjective activity.

Such an approach involves the use of argumentative and rhetoric means as a necessary precondition. Within this context, rhetoric and argumentation are not to be seen as mere skillfulness or techniques of persuasion but as necessary components of a pragmatic approach to looking for the best design solution. Testing design hypotheses is therefore inextricably bound up with the ethical normative framework of society and with its epistemological principles. As a consequence, design relies on both the methodologies of science and art, and from there derives its own methodology. Understanding how they interact within a design process is crucial for understanding how knowledge can be built by design.

While science tries to explain the world, art questions reality and tries to answer the very personal question, "how I see and perceive that world?" The artistic inquiry is based on observation, vision, values, beliefs, reflection, interpretation, experience and expression, all at the same time. It leads to an individual hypothesis about the world, based on a

4 Ii A+U

IV JORNADAS INTERNACIONALES
SOBRE INVESTIGACIÓN EN ARQUITECTURA Y URBANISMO
4TH INTERNATIONAL MEETING
ON ARCHITECTURAL AND URBANISM RESEARCH

3

questioning model and impervious to testing. It is a "forever" hypothesis, questioning, synergetic, confronting, visionary and communicative.

Within this context, research by design is an essential cornerstone as it conceives possible realities, investigates their desirability, changes the existing reality by implementing a new one and evaluates the resultant reality. Research by design tries to explore and change the world, and by doing so, tries to gain knowledge about how man analyses and explores the world and brings it into culture: how we create a man-made world. It does so by creating design applications, relying on technological knowledge and artistic interpretation.

Design is the activity *par excellence* to bring culture into a tangible reality. It unites the methods of science and art to produce innovation and economical growth to the benefit of the coming generations. And it can only fulfill its task when embedded in an environment of critical and creative thinking. It is inherently innovative, heuristic and experimental, driven by empathy and focused on problem solving. It essentially deals with complex and multivariate conditions, problems with multiple stakeholders, fuzzy boundaries, and where the solution is to be found between disciplines. Designers and especially architects are known to not limit themselves to problems as "given" in a well-established brief, but will always try to reformulate, restate and find problems not previously identified.

Historically, much emphasis has been placed on design practice and production -– the design product – and far less on the educational and research aspects, or the design process and design thinking. Design in the next decade will move beyond the product and beyond the workflow, dealing with complete processes, entire environments and global experiences.
Designers should have a heightened multi-cultural awareness, enabling them to better explore ideas, envision themselves as multidisciplinary thinkers, express ideas clearly in a variety of media and circumstances, develop, attract, and ultimately affect diverse audiences, and explore various professional, cultural, and social contexts as they relate to personal and collective goals.

In his famous treatise on the sciences of the artificial, Simon (1996) advocates a "science of design," that could establish a fundamental and common ground of intellectual endeavor and communication across the arts, sciences and technology. The challenge is to see design as an interdisciplinary way of problem solving but also as a discipline in its own. It is, as Cross (2006) remarks, the paradoxical task of creating an interdisciplinary discipline.
A consensus seems to grow among many authors in different fields of knowledge about the fact that there exists something that could be described as "design intelligence": a way of thinking that is different from both scientific thinking and from an artistic approach to the world. This would be design as a "third way" (Foqué, 1996), with its own paradigms and method of inquiry, and the recognition that conventional dualistic thinking does not offer any perspectives that can be used to deal with global problems in a world where change is the steady state.

It is essential in such a process that the hidden theoretical and ideological framework of assumptions and premises on which decisions are based, are made explicit. This is not to say that it should be a general metaphysical analysis, but it should make transparent how the specific design beliefs are determining the normative knowledge about the physical world and how this physical world should be organized. It is a process, and it

IV JORNADAS INTERNACIONALES
SOBRE INVESTIGACIÓN EN ARQUITECTURA Y URBANISMO
4TH INTERNATIONAL MEETING
ON ARCHITECTURAL AND URBANISM RESEARCH

4

refers to the process of pragmatic thinking put forward by Dewey (1923) and later by Putnam (1995). Pragmatic thinking reflects a unity of the process of learning and experience, of conceptual thought and situational consciousness. It is based on a backward and forward connection between what we do to things and what we enjoy or suffer in consequence. Under such conditions, doing becomes trying: a kind of experiment to find out what the world is like and what it should be. It is per se heuristic, as the purpose is to discover at the same time the existing connection between things and the possibilities of connection.

In this sense design enquiry consists of determining which elements constitute the design context and which structural patterns determine its cohesion. Therefore it always will fluctuate between the analysis of objectively perceptible facts and the weighing of subjective value judgments.
This is where the notion of creativity comes in. The analysis of creative processes makes it clear that they occur in the zone between unconscious intuition and rational thinking, allowing the designer to propose original solutions to a given problem.

One of the problems related to the pragmatic approach is the validation of the obtained results, as all data seem to have an individual and relative status. A clear, commonly accepted, and universal value system against which we can verify the results is non-existent. In present society, knowledge is increasingly legitimated by performability, as argued by Lyotard (1985). It is indeed typical in the postmodern condition that performance supercedes scientific grounding and consistent legitimating.
Scheffler (1965) points out that knowledge can be legitimated in at least three different ways: rational, empirical and pragmatic. Rationalist knowledge is obtained through pure logical reasoning, mathematics being a good example. Rationalist knowledge relies entirely on its own premises and arguments and from that derives its legitimizations. Empirical knowledge relies in essence upon sensory experience. Validation is through the senses: I can see it, I can feel it, I can hear it, I can smell it. Pragmatic knowledge emphasizes the experimental nature of certain forms of experience. It is a practical form of knowledge and it may not be possible therefore to generalize it into a universal truth. It is precisely this kind of knowledge we are dealing with in design processes.

Pragmatic knowledge is always contextual, and contextually-bound knowledge is per se unique in place and time. It is derived at the same time from observation, experience, and performance, where the position of the investigator itself is part of that context. I call this the biperspective character of the design activity, pointing to the isomorphic principle between the physical and social worlds in relation to the cognitive mind. Case studies try to deal with this aspect in a descriptive and evaluative way. Their general starting point is best practice and how in a best practice situation problems are handled, decisions are made and solutions are obtained. This is in particular the case in medicine, law and business administration and is also to be applied to architecture. It implies that there should be a common agreement amidst the profession on what constitutes "best practice" in general terms, and within a given situation in particular. Such a framework of standards will both rely upon and build on shared knowledge between the members of that profession.

Therefore, the study of a single or series of cases can only be successful if it acknowledges this condition. But if it does so, the study may transcend that condition by sharing it with the professional community and become validated in its own rights. By

5

IV JORNADAS INTERNACIONALES
SOBRE INVESTIGACIÓN EN ARQUITECTURA Y URBANISMO
4TH INTERNATIONAL MEETING
ON ARCHITECTURAL AND URBANISM RESEARCH

sharing the results of case studies, the profession itself accepts or refutes that knowledge, analogous to what happens to the results of a scientific experiment. But where in a scientific experiment the facts are proven true in an objective and repeatable way, case-based knowledge is proven in a subjective way based on a professional consensus model. Through consensus, subjective data become accepted as fact and by doing so, contribute to the construction of theory and the building of a body of knowledge.

In a discussion of the changes in architectural education, Tschumi (1995) highlights three great shifts, which are also relevant to the discussion above. Tschumi situates a first split in the 17th century with the creation of the first school of architecture, the Académie Royale d'Architecture in Paris. From that moment on, the architect no longer learns at the construction site, but at school. A second split occurs in the 20th century with new methods of construction developed by the building industry. As a result, the architect loses control of the building process. Finally, as a fall-out of the 1968 happenings, theoretical concepts become more important than practical realizations. This lead to a kind of theoretical practice, which forgoes building for publishing, and gave rise to the starchitects, who do a well-published sketch design, which is then made buildable by an anonymous job architect. It illustrates how the architect has moved away from his core business: "building." The growing impact of ITC technology on the design-build process at an unprecedented speed, adds yet another dimension to this dramatic shift in the profession.

Now more than ever, we witness a nearly schizophrenic situation in most architecture schools around the world. Theory and design practice are dissociated, they develop their own content along different lines and faculty communicate little with each other about what they are teaching and how one could enhance the other. Although architecture schools still teach architectural knowledge, it is split up into packages of specialized disciplinary knowledge, such as architectural history, architectural theory, construction methods, material sciences, building systems, etc. Hardly any attempt is made to integrate them, to teach the students to see the connections and the impact on design decisions by studying real cases and bringing that integrated knowledge to the design studio.

Although the study of precedents appears in most architectural curricula, this does not lead to the creation of a body of knowledge as found in medicine, law or business administration. Russell (1995), discussing the use of precedent studies in architectural education, mentions that the reason for this is that thorough knowledge is said to destroy the creativity in the student, who should pursue innovation at all times, and therefore the notion of a teachable body of knowledge became explicitly ignored. Furthermore, we have seen that the modernist tradition in architecture has introduced the belief that originality is essential for "good" architecture. This may be an even stronger explanation of why the architectural profession has for so long has been averse to shared knowledge.

However, by learning through practical experience, practitioners take the content of what they are taught and what they acquire in practice, and try to build their own theory. This theory is essentially pragmatic, necessarily dynamic, and relative to the practice situation. Case-based research is the cornerstone of the reflective practice and the key to the development of theory from practice, as it has the potential to transcend individual theories into generally accepted theoretical frameworks.

IV JORNADAS INTERNACIONALES
SOBRE INVESTIGACIÓN EN ARQUITECTURA Y URBANISMO
4TH INTERNATIONAL MEETING
ON ARCHITECTURAL AND URBANISM RESEARCH

6

References

Cross, N., 2006, *Designerly Ways of Knowing*, Springer-Verlag Ltd., London.

Dewey, J., 1923, *Democracy and Education*, The Macmillan Company, New York.

Foqué, R.K.V., 1996, "Design Research: The Third Way", in *Doctorates in Design and Architecture*, Vol. 1, Delft University Press, Delft.

Foqué, R.K.V., 2010, *Building Knowledge in Architecture,* University Press Antwerp, Brussels.

Jarvis, P., 1999, *The Practitioner-Researcher*, Jossey-Bass, San Francisco.

Lyotard, J.F., 1985, *The Post-Modern Condition*, The University of Minnesota Press, Minneapolis.

Putnam, H., 1995, *Pragmatism: an Open Question*, Blackwell Publishers, Oxford.

Russell, B., 1995, "Paradigms Lost: Paradigms Regained", in *Educating Architects*, (Ed. Pearce, M. and Toy, M.), Academy Editions, London.

Scheffler, I., 1965, *Conditions of Knowledge*, University of Chicago Press, Chicago.

Simon, H., 1996, *The Sciences of the Artificial*, 3rd Ed., M.I.T. Press, Mass.

Tschumi, B., 1995, "One, Two, Three: Jump", in *Educating Architects*, (Ed. Pearce, M. and Toy, M.), Academy Editions, London.

*This lecture is based on my book **"Building Knowledge in Architecture"**, published in 2010 by UPA.