Urban and architectural design and scientific research: how to save an arranged marriage?

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Abstract:

As a result of the Bologna treaty, many architectural and planning schools are in transition in Europe. As the educational landscape is changing, new standards are set to meet the criteria of scientific research based on higher level education. The demand to integrate scientific research in the curricula and the demand to develop a scientific research programme into planning and architectural schools is a real challenge for many planning and architectural schools, that are traditionally centered around studio work and design. Moreover, the criteria on which research output and research excellence are measured traditionally seems unfit to grasp the specificity of urban and architectural design research and education.

For some design teachers this transformation should not affect at all the primary focus on the tacit, practical nature of design study. This position postulates that practice in itself offers a sufficient condition for validation. Others advocate to revise the traditional criteria for research validation and to broaden the scope and nature of scientific research in order to reconcile science and architectural or urban design.

In this paper we argue that neither a strategy of business as usual, nor a strategy of stretching up science are a defendable approach to the demands of a transforming educational landscape. We propose that instead of altering the criteria of scientific

excellence and output, design excellence and output should be assessed by its own specific criteria and institutions. We develop a framework in which a distinction is made between different forms of knowledge, and suggest how different criteria can be applied for design excellence and output.

Introduction: The arranged marriage of science and design

As a result of the Bologna declaration of 1999, many architectural and planning schools are in transition in Europe. The declaration of 1999 aimed to develop a uniformed structure of higher education in Europe, making academic degrees comparable and promoting mobility between European institutes. The declaration set in motion a reform process of education towards a system based essentially on two cycles: a first cycle geared to the labor market and lasting at least three years resulting in the degree of Bachelor, and a second cycle conditional on the first one, resulting in the degree of Master[1].

Although Universities in Belgium have been able to transform their education structures successfully, the University Colleges (*Hogescholen*) are still undergoing a reformation process. Some of the former Colleges in Belgium, provided a two cycle education programme, and are considered *de iure* as academic courses. However, the Flemish Government which is competent for education in Flanders, had devised a process of "academization" in order to increase and strengthen the connection between academic research and academic education in the university Colleges. Together with this academization, the Flemish government decided to rationalize the educational landscape and set in motion a process of the integration of the former two cycled courses of the Colleges into the Universities. As the former architecture

[1] The European Higher education area, 1999, The Bologna Declaration of 19 June 1999

college schools (including interior design and urban design) also provide a two-cycled system, they are now in this process of "academization".

The process of academization of Architectural Schools proves to be an all but smooth process. The demand to integrate scientific research in the curricula and the demand to develop a scientific research programme into planning and architectural schools turns out to be a real challenge. Many planning and architectural schools are traditionally centered on studio work and design. Academic research was nearly absent in former *practice based* design teaching, and the staff of the former architectural schools did not have track record of traditional academic output, such as peer-reviewed articles, peer-reviewed academic books or conference proceedings. When assessed by traditional indicators of academic production, the architectural schools therefore severely underperform.

Confronted with the poor research assessment outcomes, the academization process (re)started in the Flemish architectural schools a fierce discussion on the nature and the role of science and academic research within architecture, and related disciplines as urban design and interior design. Within this discussion, broadly two basic viewpoints can be traced. One viewpoint is seeking to conform to the traditional media of scientific output, oriented to journal articles, books, conference proceedings etc. and to shift the research focus into more vested research disciplines, which have vested methods and established media for academic output. Such a strategy of academization might be successful for a part of the staff that focuses on supporting disciplines of architecture and Planning such as architectural history, construction engineering, environmental psychology, political sciences, building economics, process management, cultural theory…. However, this strategy is largely unattractive for the majority of the teaching staff in Architectural schools that lack any track record in research, is design oriented and faces a fierce competition with more established institutes in these disciplines on research funding. Moreover, such a research program is felt as an alienation from what is often considered as the core of the discipline, namely the design process.

Therefore a second viewpoint increasingly emerges, which aims to transform the vested methodologies in validating and assessing academic research output. Central to this approach is the idea of design based research. Illustrative for this viewpoint is the declaration of the European Association for Architectural Education, which confirms that "*architectural research has a particular knowledge base, tools and methods*" (EAAE, 2011). It therefore calls for a "*recognition of all appropriate areas and modes of architectural research, for better definition of context and scope and acknowledges research by design as part of the diversity of valid methods with which to research, practice and study architecture"*. A similar viewpoint comes from the UK Research Assement Excersise (RAE, 2006). Panel H, responsible for the RAE of Architecture and the Build Environment defines research output as "*any form of publicly available, assessable output embodying research as defined for the RAE may be submitted, as may confidential outputs that are not publicly available (p10)*". The Panel declares that "*In addition to printed academic work, research outputs may include, but are not limited to: new materials, devices, images, products and buildings; intellectual property, whether in patents or other forms; performances, exhibits or events; work published in non-print media"* (p10). The appendix of Panel H also specifies how research excellence should be assessed. It provides a peer review process of research output, assessing with criteria of originality, significance and rigor. Significance will be assessed *by dissemination and impact, and the work will be assessed on actual and/or potential significance, in recognition of the time-frame over which some work reaches and influences its audience*. In panel H no bibliometric data will be used to assess the impact. Rigor is defined *as including research processes which are* ***not necessarily systematic or linear****, yet demonstrate intellectual precision and material integrity, and innovations in process and/or product in relation to its context (p 24, emphasis added).*

Panel H holds an extremely relativistic approach on the nature of scientific knowledge and scientific output. The basic motto seems to be: everything goes, as long as it is confirmed by peers. It is therefore assumed that a consensus between panel members on originality, rigor and significance is sufficient to demarcate scientific work from non-scientific research. But in the first place, these criteria do

not reflect a coherent conception of scientific research or output. Its incoherence is easily demonstrated when rigor is defined as “not necessarily systematic or linear”, implying thus that rigor can be unsystematic, which is a contradiction by itself. Furthermore, correspondence with truth or experience (external validity) seems not to be a criteria of research output. Thus according to the Panel, original, significant but not necessarily systematic, ideas that are plainly wrong can be considered as valuable academic output.

But even if the demarcation criteria between science and non-science were clear, the proposed assessment method of panel H is likely to result in severe bias. Panel H is overwhelmingly silent upon the many potential failures of panel judgments such as group think (JANIS, 1972), peer pressure and power relations. Certainly if research outcomes cannot be validated or reproduced by other researchers (such as images or buildings), there is no external impetus to be self-corrective on the longer run and to separate scientific findings from non-scientific findings. Power relations between institutes, norms of reciprocity between the assessors with affiliation to the institutes all might trigger strategic behavior in these panels, rather than a sincere, neutral evaluation of research output. Sure, the traditional peer review process of journal articles follows a similar procedure and might have a similar bias. However, the anonymous peer review process of journal articles is only one step in the validation of scientific output, and the fallibility of the review process is backed up by bibliometric citation patterns, but also the tendency to self-correct over longer periods when research outcomes cannot be reproduced by other researchers or do not match new findings (KUHN, 1972).

One might argue that the demarcation between scientific output and non-scientific output is artificial or old fashioned. However such an argument would contradict the process of academisation itself, and would raise serious questions on the role public funded universities and academic institutions in society. If the academic institutes mission is to produce scientific research output, but if there is no demarcation between science and other forms of knowledge or action, than the purpose of academic institutions is obsolete and there is no legitimation for their existence. Any

assessment method which is not based upon a philosophy of science and a set of demarcation criteria is therefore doomed to fail. The real basis question for Architectural Schools is thus not how to assess research output, but how design output can relate to scientific output?

Design versus science

Obviously history repeats itself in the course of this debate. In the former century, academic discussion on design and research appeared, faded away for a while to re-appear again. The discussion develops mainly along two lines *art versus science* on the one hand and on the other hand the *Practice based research (PbR) versus academic research.*

Nigel Cross observed a 40 year cycle of alternating pro's and con's concerning the possibility to 'scientise' design. (N. CROSS 2001:49) Already in the early twenties of the former century the 'Stijl' movement questioned subjective speculations in Art and design. The movement aspired for more objective methods in the design process. A similar aspiration occurred in the 'design method movement' during the sixties of the former century. Objectivity, rationality and method were key issues at the 'Conference of the Design Method' in 1962.

In the broader 'planning community' similar movements can be traced during the fifties and sixties with – in the footsteps of Wiener - the introduction of the computer based 'cybernetic' models, elaborated by Chadwick and Mc Louglin during the heydays of synoptic planning. A setback came in the seventies with, for instance, Christopher Alexander – although a former adept of a rational, methodological approach in design - questioned the plausibility of an objective method in the design process. Alexander affirmed:

" I've disassociated myself from the field… There is so little in wat is called 'design methods" that has anything useful to say about how to design buildings that I never even read the literature anymore…I would say forget it, forget the whole thing" (quoted by N. CROSS 2001:50)

Also Christoppher Jones deplored *" the machine like language, the behaviorism, the continual attempt to fix the whole of life into a logical framework". (quoted by N. CROSS 2001:50)*

Cross justly places these statements in the social and cultural climate of the late sixties with the rise of radical political movements on campuses. Needless to remind that a then dominant positivist current in social sciences had to deal with a same kind of criticism. A new turning tide appeared in eighties en nineties with emergence of new journals of design research, theory and methodologies creating a new forum for reflection on 'scientisation' of design.

Cross suggested new categories in order to break through obstinate obscurities in the debate among 'believers' and 'non believers' concerning the place and the meaning of research in design matters. According to Cross, 'Design science' stands for a belief in a rational method, 'Science of Design' should focus on the study of the nature of the design process and the 'Design discipline' emphasizes the specific nature of a design practice. (*CROSS 2001:51-53*) In his conclusion Cross sees broad opportunities for design knowledge in the specific object of the design discipline:

"What designers especially know about is the 'artifical world' – the human-made world of artifacts. What they especially know how to do is the proposing of additions to and changes to the artificial world. Their knowledge, skills, and values in the techniques of the artificial (Not 'the sciences of the artificial'). So design knowledge is of and about the artificial world and how to contribute to the creation and maintenance of that world…." (*N. CROSS 2001:54*)

Question is whether the definition of this supplementary category of a 'Design discipline' can completely dispel the confusion. The 'artificial world' can hardly be considered as the privileged territory of a design discipline. Close encounter with sociology, cultural anthropology, literature and linguistics and so on and so forth, seems to be inevitable within this field of 'study' and the introduction of this new

category does not clarify the particularity of the ‘discipline’ like approach of the former against the ‘science’ like approach of the latter.

Cross’ reference to former discussions about art vs. a scientific practice then centers around broad dichotomized categories like art vs science, fact vs. value, truth vs. opinion, positive vs. normative, rigorous vs. intuitive etc. For the believers of ‘scientization’ of design the challenge then is to push research practice to the other side of the opposition.

More recent reflections in favor of a ‘scientisation’ of the design discipline clarify the fundamental requisites for a science image modeling of design research. De Jong and Van der Voordt for instance underline in a quite exhaustive reader on design and research the importance to adopt *methodological* standards in design research: 1) reliability or the possibility of repetition of measurement under unchanged conditions; 2) validity, dealing with adequate measurement of concepts 3) open to criticism; 4) scientific relevance, or the perspective of deepening the development of the discipline in question.

“If a (tentative) design applies for being branded as result of scientific activity, it should comply with general requirements put to the scientific approach, to wit: inter-subjectivity, reliability and verifiability in an empirical sense. ‘Inter-subjective’ was defined … as ‘interpreted by different people in the same way’… Verifiable points to the description of the design in terms of the grounds on which the decisions have been taken, including validity and tenability. Additionaly, ‘verifiable’ includes, that the design can be specified according to concrete situations and can be generalized to possible applications in different situations or contexts. (De JONG T; VAN DE VOORDT T 2002: 25).

The position of these scholars is quite radically stated in the introduction of the reader:

“If design is left to creative powers and does not need to comply with scientific criteria, each and every university education lacks it’s right to exist”. (DE JONG; VAN DER VOORDT 2002: 12)

But conclusions of De Jong and Van der Voordt remain ambiguous. The authors admit that *hard* criteria of science cannot in all situations be met in design research. The standard of reliability becomes precarious when multi-functionality leaves open more possibilities than predictable during research; design is context sensitive, hence resistant to validity claims and to the possibility of generalization. Moreover, if reflection would be broadened – which is mostly not the case – to methodological differences between the three families of science –exact sciences, social sciences and design sciences- , other questions might support the effort of comparison and demarcations. What about for instance the status and the role of theories in design research? Taking into consideration the context sensitivity of design 'discipline', are under certain conditions nomothetic statements conceivable in design research or not? Is the inevitable use of normative theories (not *what is*, but what should *be*) in design research part of the restriction to the applicability of the hard science model in design research? Reminiscence of analogue questions in the history of social and human sciences – the so called 'methodological struggle' is inevitable.

It is striking that comparisons of scientific research with design research refer either to an undifferentiated image of science or restrict to a sole comparison with the logic of research in exact sciences. Reflection on a possible common ground with the methodological ambiguities in social and human science - the so called double hermeneutic (GIDDENS,A., 1976) – is scarce, though it might deepen insight in similarities or distinctions in the logic of research within the three science families on one hand and designingly research on the other hand..

Differentiation of the practice of scientific research can be conceptualized on four dimensions – epistemology, theory, techniques and morphology (DE BRUYNE P; DE SCHOUTHEETE, HERMAN J., 1974). Similarities and differences in research practice are roughly schematized under these four dimensions.

		EPISTEMOLOGY	THEORY	TECHNIQUES	MORPHOLOGY
'Exact sciences'	Goal Means *World Orientation*	Objective 'truth' seeking as an open system Probability Hypothetical – deductive ' Mind to world'	Explanation Generalization about how the physical world behaves Empirical concepts	Quantitative Measurement Statistics Experimental Quantitative	Coherent, logical consistent statements; Predictive statements Symbolic mathematical formalization Quantification Output: peer reviewed articles; books manuals
Social/human sciences	Goal Means *World Orientation*	Objective 'truth' seeking as an open system Probability Hypothetical – deductive **or** interpretative, heuristic ' Mind to world'	Explanation (causality; correlation) or understanding (verstehen); ideal types about how the social and meaningful world behaves Hypothetical – deductive method or 'ideal types' Empirical concepts	Measurement or classification; typology statistics Experimental; quasi experimental Or heuristic Quantitative or Qualitative	Coherent logical consistent concepts and statements Discursive; narrative; metaphorical Output: peer reviewed articles; books; manuals
'Design discipline'	Goal Means *World Orientation*	Normative, action oriented Possibility Testing design solutions World - to - mind	Normative (normative) Spatial concepts Spatial vision	Scale modeling Drawings; Typôlogy	Visual Narrative Metaphorical Prescriptive statements

Inevitably, for the sake of clarity, the scheme offers only a basic comparison, further differentiation can/must be made within the 'traditional' science families. A psychological aspect, a mental state, the intentional orientation to the world, is placed in this scheme under the epistemological dimension due to epistemological implications. Unquestionable a fundamental similarity between the three science

families is what Heilighen, Cavallin and Bianchin – inspired by J. Searle - call a 'mind- to- world direction of fit'.

"…The mental activities of a scientist are characterized by a mind-to-world direction of fit. Researchers seek knowledge as an end in itself…The beliefs and insights they produce may be true or false, and it is their responsibility to match the world in order to be true and therefore successful (A. HEYLIGHEN, H. CAVALLIN, M. BIANCHIN 2009:97)

By contrast, a designer's mental activities seem to be dominated by a world-to-mind direction of fit. Designers are concerned not only with what is, but with what should be. Their attention is focused on possibility, "*the search for new or better solutions to problems encountered in everyday living*". *Thus, even if architectural design contributes to the creation of knowledge, the knowledge created is usually a side-product of an activity with another aim. Moreover, the solutions designers produce cannot be true or false*" (Ann Heylighen, Humberto Cavallin, Matteo Bianchin 2000:98). The mind – to – world direction of scientist is founded on theory based research, generating hypothetical statements about the behavior of the physical or social world[2], and structuring research activities aiming at the corroboration of those statements.

A clear distinction between the 'exact' sciences on the one hand and 'social sciences' on the other hand involves the status of theories (range of explicative power; predictive power etc.), the nature of corroborative procedures (hypothetical testing vs ideal type understanding) and the nature of discursive argumentation (use of mathematical models; role of narrative etc.). A fundamental demarcation between the three science families vs. 'design sciences' is the (mainly) world-to-mind mental activities of designers, focusing on possibilities, on the search for better (spatial) solutions. It explains the normative nature of its theoretical frameworks, the action oriented spatial concepts and the highly *prescriptive* character of design statements vs. the *descriptive or predictive* character of scientific statements. (LADRIÈRE, J., 1969). Obviously, claiming a scientific status for design research, by solely referring

[2] In his 'road to reality' the mathematician and physicist Roger Penrose states that modern scientists avoid the 'what question' (what the world is; or why the world is what it is) but prefer questions in terms of how reality behaves (Penrose: :1028)

to a necessary adoption of *methodological* criteria like validity and reliability is not a sufficient condition to legitimize this claim. Epistemology, theory, morphology and adequate techniques are inseparably linked. Whether one wants to explain (causality; correlation) or to understand (heuristic) will affect forms of exposition and chosen techniques (qualitative or quantitative). The nature of involved theories will structure the whole research strategy, being a consistent set of methodological decisions, in the blueprint of the research process.

Up to now, an important *missing link* in the discussion about design research as scientised activity is the role of theories in structuring the practice of (academic) design research. Especially the notion of validity is interwoven with theory based research in common scientific practice. Internal or external validity refers to theoretical concepts and to more or less adequate operationalization of those concepts through index construction and measurement.

Clarifying the shift from art to science on a continuum, with art on one extreme and science on the other, earlier mentioned scholars Van de Voordt and De Jong consider typological studies in architecture and urbanism and 'research by design' as examples of a scientific form of research. The concept of 'research by design' is an interesting case. It gets privileged attention in the present discussion on 'academisation' and 'scientisation' of the education program of architecture and urban design. Tough definitions of this type of research can still vary from scholar to scholar the definition of Van de Voordt and De Jong will probably be endorsed by many. They define study by design, or research by design as "t*he development of knowledge by designing, studying the effects of its context, and studying the effects of its transformation…*" (Van de Voordt; De Jong; 2002: 455). An important element is the research like character of design, operating in function of research not in function of a design program.

Subtypes can be distinguished according to the degree in which the objet and context (space, time, programme, boundary conditions), are constant or variable. Some scholars will add the importance of participation of involved users or stakeholders in the design process. In that case it is considered as a form of action research, quite

similar to this research method used in social sciences. Emphasis on the primordial role of knowledge development (design in function of research) explains the privileged attention for this kind of research. However, considering the *pure methodological* nature of this form of research it is quite unclear – taken into consideration the variety of contexts and the singularity of situations - how this *design driven* methodology might develop to a theory driven scientific practice. The morphological dimension of research (morphology in the sense of forms of expositions, of syntax etc.) is rarely subject of investigation, though an essential part of the process. Examples in social sciences are semiotic approaches by Greimas and Landowski in their discourse analysis of social science discourses (A J.,GREIMAS, E. LANDOWSKI, 1979) and McCloskey's illustration of the role of the narrative aspect in economic expertise (D N. McClOSKEY 1992) Morphology is the place of articulated objectivity. It forces the researcher to place his/her subject of research in a 'configurative space' of presentations, of discursive articulation of research concepts and research elements (DE BRUYNE, HERMAN a.o.). Forms of exposition (e.g. style), relational statements in terms of causality or correlations, information about the objectifying process such as the chosen research strategy, are important aspects of this configurative space. In the first place one thinks about the end product of research: the output, be it a research report or a scientific publication. Their 'convincing' qualities depend on the excellence of exposition which is in the end are an essential part of evaluation by peers. But the same requirements must be met at the very beginning of the process: the elaborated proposal of a research project. In design study – unlike in fundamental science - a pragmatic approach in argumentation and persuasive rhetoric is a necessary component in looking for and presenting *the best design* solution (R. Foqué 2003: 3). In consequence this leads to a shift of meaning when terms like 'testing' and 'hypothesis' are used in a designing context. In this context testing a design assumption is not a matter of being true or false but - given a particular spatial context - a matter of being the 'best' solution based on vision and believes. (R. FOQUE 2003: 3)

"Testing a design hypotheses is therefore unextricably bound up with the ethical normative framework of society and with its epistemological principles. In addition

the testing can only be done within a well determined context which is both physical and non physical. Non physical because design is embedded in a formal, legal and historical context; physical because every design is related to the constraints and characteristics of a context, being a real site or an imaginary or virtual one" (R. FOQUE 2003: 2-4)

In a scientific context testing a hypothesis means confronting statements about an assumed relationship between phenomena with empirical facts. Ignoring this fundamental distinction of meanings runs the risk to formulate pseudoscientific statements[3] by paying lip service to a scientific syntax though deprived by means of testing in the scientific sense of the word.

This might explain why, at least in our experience, quite some *design based* research proposals seem to fail for a positive judgment in order to grant research funding. Critical reviews by academic peers applying the regular standards for eligible research proposals, often mention the absence of essential ingredients for the elaboration of consistent research proposals: the lack of a theoretical framework, and the absence of empirical measurable concepts. Some might put forward that this situation is inevitably part of typical discomforts of a maturing discipline, but, taking into consideration the essential theory driven character of scientific research and the design driven character of design research it is equally justified to question the compatibility of a scientific logic of discovery with design logic of enquiry. As Heilighen and others put it:

"By consequence, very different logics of discovery may be at work in design practice, and the way they are mixed varies from one case to another. However, this variation cannot be used to question the fundamental distinction in principle between design and research. For whatever the mix, you still need a theory to account for what happened, and this is something that just continuing designing will not be able to give you. You need some theoretical model, concept, strategy, or the like to come to grips with what has or has not worked and to explain why. In more technical words, you need an

[3] Wikipedia defines pseudoscience as; "a claim, belief, or practice which is presented as scientific, but does not adhere to a valid scientific method, lacks supporting evidence or plausibility, cannot be reliably tested, or otherwise lacks scientific status.[1]

explicit interpretation of what constituted the tacit understanding just displayed by your practice". (A. HEYLIGHEN, H. CAVALLIN, M. BIANCHIN 2009:104)

Practice based vs. academic research

A second line of discussion centers around the poles practice based (design) research (PbS) vs. academic research, focusing on the issue whether knowledge-gathering *in professional experience* can be integrated in academic research (BIGGS AND BÜCHLER 2008). As design teaching in university colleges is up to now mainly practiced based teaching this question is not of minor importance. It touches interests in terms of staff recruiting policy, funding channels and allocation of recourses and consequently also in terms of the nature of research output

The path of this discussion and of conclusions will be influenced by (inter)national differences in the organization of higher education and funding policies of research, as Biggs and Büchler made clear in a comparison of the British, the Brazilian and the Swedish case. (BIGGS AND BÜCHLER 2008); When for instance in 1992, the British polytechniques were accorded university status, it could establish discipline-specific regulation to define research. According to the authors the consequence was that criteria for research practice that previously seemed to be clear and universal in most disciplines, such as: knowledge, creativity, reference, method and audience , were put into question and generated, as they call it, 'hybrid' concepts like 'tacit' and experiential knowledge, reflexive method, grounded theory and 'knowledge – in – action'. In terms of the assessment of research quality, diverse and alternative concepts of quality and understanding were used, together with a variety of Phd models, ranging from traditional bound textual documents to the possibility of submitting a work of art or an exhibition. The Swedish case is comparable with the British case when it comes to adapted standards of research output in design disciplines. On the other hand, in the Brazilian case, the structure of higher education divided disciplines dealing with fundamental and theoretical issues from those having more a technical or productive character, design included. This distinction bears consequences for the access to research funding as professional developed

research has to rely on other than academic resources for (less substantial) financial support.

Briggs and Büchler defend practice based research as 'subcategory' of academic research and suggest the adaptation of the conventional criteria of academic research to the specific nature design practice provided that three fundamental criteria of academic research are respected: 1) dissemination of knowledge; 2) originality and 3) context. They consider these criteria as necessary and sufficient conditions for any form of academic research, whether practice based or not. Disseminating research is, according to Biggs and Büchler, necessary because the produced knowledge must influence actions of other practioners, here considered as the advancing aspect of knowledge. The opposite would be a situation in which everyone is originating knowledge for themselves which might lead to something like reinventing the wheel. Originality is necessary and sufficient. Produced knowledge must be new for an audience and not just for the researcher. Contextuality places the outcome in a critical context by making clear in which way knowledge develops or departs from existing modes of understanding. One can concur with the necessity aspect of these fundamental criteria, but the sufficient condition is not thoroughly clarified in order to consider practice based design research as a *subcategory* of academic research. Whether they are sufficient or not will mostly depend on dominant institutional definitions of academic practice, which – hardly surprising - tend to model these definitions according to the image of scientific practice.

In regular science dissemination refers to a well-defined research product belonging to what Karl Popper called world 3. (K. POPPER; 1974:210). Popper's world 3 is the world of statements in themselves[4]. Statements that stand in logical relations to each other. Dissemination then must occur in some more or less permanent form, as Popper puts it: "A written form will be preferable to a spoken form and printing may be better still". (K. POPPER; 1974:213). Furthermore disseminated statements of world 3 are inseparably related to theories as a more or less consistent system of

[4] In Popper's view world 1 is the external physical world and world 2 refers to the thought *process*, psychological in nature.

statements, which brings us back to the research structuring role of theories in regular sciences and to the question what this can mean in practice based design research as an academic subcategory.

Another important aspect of dissemination in regular science is the role of specialized scientific journals. The ideas of Thomas Kuhn became a common property when thinking of the paradigm concept – whether properly interpreted or not[5] – less quoted is the crucial role Kuhn assigns to specialized journals for the formation of a discipline or subdiscipline and eventually for the acceptance of a unified paradigm. (KUHN1972: 34) In the present integration process into the university this is not a minor issue, taking into consideration that chances for research funding are related to this kind of textual based output. Given the established university regulations about the controlling audience for assessing a claim of originality, the audience, the peers, will presumably have to match the strongly institutionalized criteria for the eligible audience. In most Flemish universities acknowledgment of *practiced based excellence* without Phd references will not fit to the standard credentials.

Last, what Biggs and Bühler consider as the fundamental necessary and *sufficient* context criterion under the label of a subcategory of academic research supposes the inscription in a firm tradition of specialized research, which is hardly the case in design research, first because any form of research tradition is lacking, second because the fairly idiosyncratic nature of practice based research complicates the creation of a common ground for a research tradition.

Integrating "design" in academic curricula

Obviously, from the above discussion, a rather pessimistic view emerges on the ability of design to ever become a vested scientific method, in the sense that design research can produce valid scientific knowledge about our external world. At best design and design research are pseudosciences, mimicking the semiotics of scientific

[5] Searching for paradigms in other than exact sciences looks like a production in line work, especially when it is interpreted in an in appropriate way. Often one seems to forget that Kuhn preferred to keep a keen distinction between 'exact' sciences and human sciences. (Van Bedegem 2009: 55)

methods, but failing to address the basic criteria for reliable scientific knowledge. The gap between design and science is simply too large, and design research methods fails to produce a logical and internal consistent epistemological framework.

But one might wonder whether design should be a scientific discipline at all? It seems to us that the discussion on design and science has simply started on the wrong footage. In fact, we believe that the career opportunities of the architectural school staff and the distribution of funds for education and research among institutes are really at the heart of the discussion, rather than a sincere and genuine discussion on the relation between design and research. There is for instance remarkably hardly any internal controversy among design researchers about the nature of their research, although the topic in itself could trigger substantial discord as we argued above. A genuine discussion would allow dissonant voices to come in, certainly when arguments from the design side often lack internal consistence and rigor. Of course, one cannot ignore that most participants in the debate have a direct stake in the issue. The new academic institutional context in which the former staff of the architectural schools will have to operate is hostile to them, and their academic position is threatened in many ways. Making design count as research would be a convenient way to accommodate to this new environment without large sacrifices.

The result is that the arranged marriage between architectural design and scientific research presumably pushes and pulls the discussion about the nature of design based research into a *logic of scientific discovery*, and that the meaning of scientific knowledge is therefore stretched beyond a meaningful concept. Such a shift is not innocent, since it leads to an institutionalization of a pseudoscientific practice within the academic institutes. One might wonder for instance how master students in architecture schools, that are supposed to have skills to use and process scientific knowledge production, will develop an understanding of science if the teaching staff holds at least a confusing viewpoint on the matter, and how this will affect architectural practice? One might wonder how the precedent of institutionalizing design research might open the way to institutionalize other forms of pseudoscientific methodologies at academic institutes. Our arguments do not

however imply that architectural schools, or design schools should not have a place within the academic institutes. The profession of architect for instance requires more competences than design only, and many of them – such as building and material technology, building physics and building economics – are firmly grounded in academic research disciplines. In an academic environment it is also recommendable that courses on research methodology are incorporated in the curriculum in order to stimulate insight in the different logics of research. We agree with Heylighen that the product of design is not a truth seeking effort, but a possible solution to a specific social demand in a very specific cultural context. This should be a value on its own. Therefore it must be acknowledged that design skills are off utmost importance for Architectural schools and that design staff should have proper means of evaluation of their design expertise and teaching abilities.

In order to save both research and design, we advocate therefore a strict intellectual hygiene. Blending scientific knowledge production and design in one institutional measurement system does not really contribute to both. Nor would a *scientification* of design practice do right to the art of design. The unique *world-to-mind orientation*, the ability to integrate various demands into original and creative design proposals, and the cultural embeddedness of design would hardly gain from the methodological approaches from the scientific discovery. If we accept that architectural design values and norm deeply embedded cultural norms in practice, practice based education such as studios should have a firm position in the curricula of architectural Schools.

A possible and more productive strategy for the integration of architectural design into academic institutes would therefore include a proper acknowledgement of design competences without necessarily being based upon scientific research. This would require a multidimensional measurement system of the performance of design-oriented fields such as architecture, both in term of career development as in for the purpose of allocating funds. Such a multidimensional evaluation could make a distinction between research output on the one hand, and design excellence on the other hand. The traditional parameters for the measurement of scientific research

output are already established. What is needed is to develop and acknowledge criteria for design output and excellence. Architectural designers produce designs of interiors, buildings, landscapes and urban configurations. What could generally be regarded as design excellence is the cultural impact architectural work has on other architectural designers in the first place and society at large in the second place. This cultural impact could be measured by indicators such as the number of key-note lectures on the work and the audience, the number of publication on the work of an architect and the number of exhibitions on the work of the architect. No doubt, this will pull back a broader spectrum of design practice into to the realm of academic performance and offer the perspective of a marriage by consent.

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