'Science' and 'Art' in landscape architecture knowledge production

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Abstract: Within landscape architecture, two main approaches exist in the discipline- one art and one science related approach. Much criticism arose on outdoor space design that relies on either 'art' or 'science' approaches. This caused avoidance and underuse of many outdoor spaces. At the basis are two problems. Firstly, landscape architecture is not an art and not a science. Because of this misconception, there is a problem of epistemological kind, resulting in a lack of suitable methods to produce design knowledge. To overcome the epistemological problem of divergent knowledge claims in art (constructivist) and science (positivist) I suggest a pragmatic epistemological approach that combines the different ways of knowledge production. Based on this, suitable research methods need to be developed, mainly employing 'research through design' methods. These epistemological and methodological topics need to be studied in depth and eventually taught in landscape architecture schools. Application of such integrated design knowledge in practical landscape architecture projects will help to create outdoor environments that do not suffer the shortcomings of 'landscape architecture as art' or 'landscape architecture as science'.

Keywords: Landscape Architecture, Science, Art, Epistemology, Knowledge production

1 Introduction of the problem

Within landscape architecture, the roles of art and science and their repercussions on both, the production of new disciplinary knowledge and education, were repeatedly addressed (Baines and Hooftman 1994, Crewe and Forsyth 2003). Some discussions revolve around landscape architecture being either art (Treib 1993, Weilacher 1999) or science(MacHarg 1969, Rose 1939). Interestingly, also in the call for contributions to this conference 'Landscape and Imagination', landscape architecture is seen as an art.

The attitudes amongst professionals about landscape architecture being either an art or a science have brought about designed environments that show manifold problems. I will sketch these problems first. Then I will elaborate on the underlying theoretical and epistemological problems.

1.1 Practical problems

Currently, many outdoor environments in cities and landscapes are designed in ways that are unattractive and do not support human use and appropriation. This leads to underuse- an effect that we especially cannot afford in the ever growing urban environments (Lenzholzer 2008). Typical problems arising from this underuse in urban landscapes, for instance, are a lack of social control, decline of real estate values in neighbourhoods and on the larger scale 'cities of long ways' (causing air pollution and excessive CO2 production).

On first sight, such problems seem to be solvable by landscape architecture with either aesthetically appealing 'artistic' design or with good civil engineering solutions (e.g. water, climate, traffic).

However, already in the past, the separate solution approaches- the 'artistic' and the engineering, approaches alone applied by landscape architects have shown to be insufficient.

The 'artistic' solution approaches have been criticized for several reasons. Often, these solutions were considered a mere 'aesthetization' of outdoor spaces. Also terms such as 'window- dressing', 'face-lifting' or 'Verhübschung' frequently occurred in these criticisms. These approaches led to the design of spaces that people sometimes did not 'dare' to use

because they were too neat or too sleek. Another 'artistic' approach in the design of outdoor spaces lead to places that were a 'Gesamtkunstwerk' or 'Design Icon' (example, see fig. 1) that was designed to be looked at, but not to be used (de Josselin de Jong 2004, Hajer and Reijndorp 2001, Kesser 1984, Schneider 2003). Such environments were often criticized as mere self-fulfilment or 'ego-tripping' of the designers without showing respect to the users.

Fig. 1: Example of a'Gesamtkunstwerk' public space, Diagonal Mar Park, Barcelona [1]

The roots of these approaches are generally situated in a tradition of educating landscape architects in schools with a Beaux Arts background (Treib 1993). In these schools, the inspiration of landscape architecture design was mainly derived from the visual arts such as painting, sculpture and later also land art (Weilacher 1999). Within this context, the young landscape architects are educated as 'artists' that design from their own personal vision on the world.

The 'civil engineering' solution approaches have also been widely criticized for even longer times. The idea of landscape architecture as engineering relies on a positivistic concept- the idea that the environment consists of purely physical entities with functional relations. The most prominent outcome of this approach, being modernist, functionalistic landscape and urban design, is inspired by the idea of the environment as a machine and as a product of rational engineering. Consequently, functionalistic, mechanistic spaces in cities and landscapes are designed (example, see fig. 2). This has led to severe criticism amongst the public who often perceives these spaces to be sterile, inhuman and 'unexciting' (Ellin 1996, Marshall 2009). The roots of such approaches are mostly found in schools that have a background in technical and natural sciences and young designers perceive themselves predominantly as 'engineers'.

Fig. 2: Example of functionalist sterile public space, Theatre square Almere [2]

Unfortunately, these separate approaches continuously show a 'pendulum movement' in their application. In the Netherlands, but also in other

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1 http://www.google.nl/imgres?q=schouwburg+Almere&um=1&hl=en&biw=1152&bih=596&tbs=isz:l&tbm=isch&tbnid=UatJIhhAspyzVM:&imgrefurl=http://straatkaart.nl/1315TJ-Traverse/media_fotos/kunstencentrum-kunstlinie-schouwburg-almere-A9u/&docid=Y6rEUqK69SLxYM&imgurl=http://static.panoramio.com/photos/original/12473349.jpg&w=3648&h=2432&ei=IHSeULKyCrCA0AXmzYC4DA&zoom=1&iact=hc&vpx=563&vpy=188&dur=4776&hovh=183&hovw=275&tx=144&ty=117&sig=114559843143843349604&page=1&tbnh=136&tbnw=215&start=0&ndsp=17&ved=1t:429,r:2,s:0,i:76

2 http://www.google.nl/imgres?q=park+Barcelona+miralles&um=1&hl=en&biw=1152&bih=596&tbs=isz:l&tbm=isch&tbnid=p3Fpyfqk21XuSM:&imgrefurl=http://www.flickriver.com/photos/roryrory/3313653205/&docid=VIXP9fGdZR4O8M&imgurl=http://farm4.staticflickr.com/3149/3313653205_c4a10c3ba8_o.jpg&w=960&h=1280&ei=_3SeUOLxCYfV0QWAw4HwDA&zoom=1&iact=rc&dur=402&sig=114559843143843349604&page=4&tbnh=137&tbnw=107&start=59&ndsp=22&ved=1t:429,r:55,s:20,i:299&tx=58&ty=100

countries, this has manifested very clearly in landscape architecture. The first beginnings of landscape design at the end of the 19th century were influenced by the Beaux Arts and soon replaced with the first functionalist, modernist approaches. These fell into disgrace and in the 1980s the artistic and in the 1990s a revival of the modernistic movement took place (Lenzholzer 2008). Such 'pendulum movements' are detrimental to the design of outdoor environments, because all the related problems are only partly solved, and especially rather replaced by new problems.

An analysis of the criticisms on the two design approaches basically often reveal the solutions already. The criticisms are about a lack of something- of 'incomprehensibility', 'usability', of 'excitement' and 'humanness'. All of them are lacks of properties that can be fulfilled by using a combination of the two approaches because they complement each other. An 'artistic' approach can enhance the excitement, aesthetic and sensory qualities and a 'scientific' approach the usability, order and comprehensibility.

The general solution to such rather practical issue seems thus clear: an integration of the two landscape architecture design approaches of 'art' and 'science'.

1.2 Theoretical problems

Consequently, one could argue that the solution simply lies in integrating the artist and the scientist in the person of the landscape architect. But this is a clear misconception- a landscape architect is neither an artist nor a scientist.

Artists work in a different context where they are commonly free to choose their concepts and ideas, their methods, ways of representation and execution. They are often not obliged to serve a community or commissioner. Landscape architects, in contrast to that, cannot operate freely. They are bound to a programme, a site, a community and commissioners. They do not have 'artistic freedom'. Therefore, the claim in the call for this conference 'Landscape and Imagination' (call section 5), that landscape architecture is art, is questionable. Nevertheless, there are also important commonalities that support the integration of art into landscape architecture methods (see section 2.2)

Scientists work on describing the world's phenomena and sometimes try to simulate or predict the behaviours of these phenomena. Landscape architecture, however, is not about describing the world phenomena, but about planning and making new phenomena in the environment. But also here, important commonalities exist that support the integration of science into landscape architecture methods (see section 2.3)

Although there are important commonalities between landscape architecture and art, and landscape architecture and science, the misconceptions that landscape architecture is art or is science lead to epistemological conflicts. Whereas art is situated in a constructivist knowledge claim (Leavy 2008, Sullivan 2010), science is situated in a positivist knowledge claim (Creswell 2009). The position of landscape architecture, however, was never clearly defined.

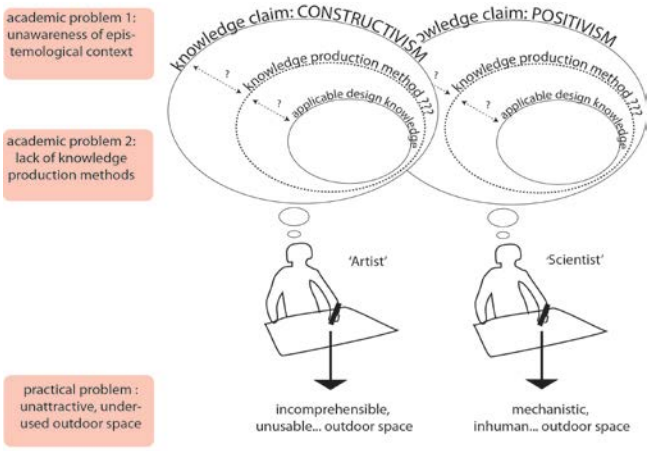

Fig. 3 Overview of problems

Consequently, most landscape architecture schools do not have a critical stance towards their epistemological context. This can be noticed in the nonexistence of discussions on this in the disciplinary literature. As an effect, the landscape architecture schools do not discuss their knowledge claims and within the knowledge claim, the way how their disciplinary body of knowledge is produced. There is no discourse on the question if the knowledge claims from art or science are appropriate to the interdisciplinary nature of landscape architecture and its knowledge production. As an effect of this 'vacuum', many landscape architecture schools do not actively participate in the production of new academic knowledge. This leads to a fundamental problem at the core of the discipline of landscape architecture: a lack of methods to produce new landscape architectural knowledge (Deming and Swaffield 2011, Lenzholzer *et al.* 2011, see fig. 3).

2 Proposal for integrated knowledge production through designing

2.1 Integration via a pragmatic knowledge claim

In order to stimulate more active knowledge production in landscape architecture, firstly, the two

separate knowledge claims that many schools work in, should be integrated into a 'pragmatic' knowledge claim (Creswell 2009) knowledge claim. Within such a pragmatic knowledge claim researching landscape architects need to look into a broader variety of epistemological positions and the related research methods and evaluation criteria. This way, they can find the knowledge claims that suit their research topics and related questions best.
Many of these research questions relate to the processes or outcome of design activity: design products, either site related or more generic prototypes or design guidelines. To generate such design knowledge, the active employment of designing in the research process is necessary (Lenzholzer 2010, p.111-120).

Therefore I suggest the use methods of 'research through designing' whose suitability and usefulness has recently gained first attention within landscape architecture academia (Duchhart 2011, Jonge 2009, Lenzholzer 2010, Lenzholzer *et al.* 2011). To define such research through designing methods for landscape architecture, it is useful to turn to the disciplines of art and of sciences (and their respective knowledge claims constructivism and positivism) to examine related methods in these contexts.

2.2 Meaning of research through artistic methods

Within the arts the writings of Donald Schön on "knowing in action" and "reflection in action" (Schön 1987) were important to shape the ideas what research through artistic activities can be. Schön significantly inspired artists and art theorists. Eventually Christopher Frayling suggested that many artists and designers do "research through art and design" (Frayling 1993) to generate new knowledge. Later, others refined these ideas and gave many different examples of how art practice can contribute to the generation of new knowledge (Sullivan 2010), (Leavy 2008), (Gray and Malins 2004). They all emphasized that research through artistic practice is based on formulating questions that are relevant for knowledge production in the field, by identifying suitable practice based methods and finding answers or drawing clear conclusions. Especially the 'generative strength' of art practice contributing to knowledge innovation, through the generation of forms and artefacts was pointed out as opposed to more descriptive or analytical types of research (Barrett 2006). But also the ability to identify and formulate new problems seems special for artists (Getzels and Csikszentmihalyi 1976).

This continuous quest for original form and innovation in 'artistic research' can be useful for research through designing in landscape architecture. Such artistic methods can help to find new problems for landscape architects, and also help to come up with original and innovative solutions. Such methods are thus specifically valuable in the phases of research through designing when problems, concepts, ideas need to be identified and new and original form needs to be generated.

2.2 Meaning of scientific research methods

As opposed to the arts, most sciences are descriptive and thus do not generate new forms or artefacts. But within the engineering sciences, such creation of forms and artefacts is actually the case and therefore, these sciences can provide useful research methods for landscape architecture.

In the engineering sciences a positivist knowledge claim is prominent, which is reflected in the writings of important engineering theorists (Simon 1996, Eder 1995, Hubka and Eder 1987). Mostly, hypothetico-deductive methods are used. These methods normally consist of several steps. Initially, this encompasses generating a design- either in 1:1 mock- ups, prototypes, in scale models or as a virtual model. The design acts as a hypothesis or conjecture which is subjected to testing (Zeisel 2006). The tests can consist of using the prototypes or mock- ups in experimental setups. Typical examples are, for instance, the testing of materials by exposing them to certain outdoor environments or by testing car, airplane or building models in wind tunnels. Recently, the trends in testing methods have shifted towards computer simulations where numerical data are frequently translated into visual representations. The tests results are mostly evaluated with quantitative criteria. Such research through designing processes are not only common in academia, but also in research and development departments in industry (Breen 2002).

The process of designing in engineering often has a sequence of designing, testing, evaluating, refining/ adapting the design and submitting the design to another circle of testing. Such processes are normally repeated until a 'satisficing' result is achieved. 'Satisficing' means that- given the context of many constraints- for a design, a design can never be optimal for all aspects, and can only be optimized for the aspect tested to a certain extent (Simon 1996).

These science- inspired hypothetico- deductive methods in engineering science predominantly provide numerical and rather objective information with a focus on testing measurable parameters such as functionality.

The important qualities of these methods for

research through designing in landscape architecture lie in the objectiveness of testing and evaluating. These scientific methods can greatly enhance the validity and reliability (and thus also credibility) of the new knowledge about artefacts or designed space. Such methods including scientific physical or virtual simulations can be used to test landscape architectural design proposals. These methods can- apart from testing designs for real sites- also be used to test prototypes of spatial models that can then serve as generalizable design guidelines.

3 CONCLUSION

The qualities of art and engineering science methods in research through designing are thus complementary. To understand these qualities and their respective approaches, it is important to understand the major epistemological and methodological differences for researching landscape architects.

Therefore, the knowledge claims and their respective methods and how to combine them in a pragmatic approach have to be taught to the new generation of researching landscape architects.

In research through designing processes with a pragmatic approach, the methods from art and science can be used in certain phases of the research through designing process so that they complement each other. For instance, the generative strength of artistic ideas can help to invent new possible landscapes. These can then be tested with the rigid methods of a scientific approach, for instance on their functionality. Subsequently, the best solutions can then be evaluated and adjusted according to aesthetic parameters with artistic methods. And possibly the outcome will undergo a new round of further development and testing.

However, to make such research methods 'teachable', a lot of research still needs to be done and especially educational experiments with research through designing on MSc and PhD level need to be conducted.

Eventually, when such combined methods have been developed, these methods will produce more integrated design knowledge that can then be disseminated. This will thus firstly happen in education and will later hopefully be translated into design practice by a new generation of landscape architects.

When this translation into built environments has taken place, outdoor spaces can be designed in a way that combines the good qualities of each approach- the originality and sensory appeal of artistic approaches and the functionality of engineering approaches.

This will make outdoor spaces more attractive and used. This way, the unnecessary waste of space in cities and landscapes can be put to a halt. In the example of the design of urban landscapes, this will contribute to solve the problems mentioned earlier: making outdoor spaces more safe and preventing economic losses in real estate due keeping the environment attractive. And last but not least, an intensely used city is a city of 'short ways' that creates less motorized traffic and diminishes problems like pollution and CO2 production. So, attractive and well used space eventually contributes to a more sustainable environment.

But this requires major changes in landscape architecture research and education in the first place- an exciting challenge for landscape architecture educators.

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