

NEW EPISTEMIC APPROACH FOR A SUSTAINABLE BUILT ENVIRONMENT

Abstract

This position paper is written in the context of a graduation project for the studio AE (Architecture Engineering) and its main goal to research the impact used research methods on the final design. The main focus of AE studio is 'the integration of (new) technology in Architecture' with sustainability as a guideline, this asks not only for new research and design approach but mostly for a new way of dealing with architectural. In this essay, through a deep study of the historical epistemic approach, I have been able to reflect on my own research and on the Architecture Engineering field in order to develop a new epistemological approach. The main goal of this paper is to establish guidelines for a personal position within architectural profession.

Introduction

During the architectural history, architects have been always confronted with challenges and the way they tried to deal with them, didn't always meet the expectations of building users. Think, for example, at the way the architects responded to the explosive population growth of European countries in the '50s. The modernistic design approach of an Open Society (characterized by open urban block with in-between a lot of green and public space and presented all-inclusive strategies in anticipation of a much more mobile society (Swenarton et al., 2014)) lead to an explosion of large-scale urban plans as city extension. 'This CIAM's rationalistic approach in particular, rather than producing a new urban environment, created territorial divisions in terms of monofunctional areas, characterized by monotonous repetitiveness' (Hengeveld et al., 2008). Even the response of Team 10, in the '60s and early '70s, to this large-scale and monofunctional open-block seemed not to work as their social and political perception of architecture and urbanism (open and all-inclusive, democratic and egalitarian society) were not in adequacy with the then prevailing society. Nowadays, in the practice of their profession, architects and urban planners are confronted to the issue of the climate change with all that it implies and must take it into account in the whole design process. This assumes that not only Architecture has to be rethought in its most intrinsic character but also that architects and urbanists profession must be reinvented to respond to this climate change problem by not only proposing alternative solutions but most of by offering preventive solutions. That implies a new approach and new 'methods of architectural exploration, evaluation and discovery'. It brings to the forefront the methodological issue of 'architecture and its episteme' and leads to the research question of this position paper:

To what extent can an epistemological approach of architectural profession contribute to sustainable innovations within the built environment?

The research- and design methods of Architecture Engineering (AE) studio may differ with other architecture field but the methodology used by architects and urban planners to respond to their 'zeitgeist' is similar and can contribute in the finding of new solutions for our current pollution issues. First, we will look at the historical precedents where architects have faced challenging issues and the way they have responded to it. After taking a short look at the context, we will analyze the 'strategic apparatus' used during the research and design phase of my graduation project by

reflecting on those used by other architects. And after defining the new role of the contemporary architect we will conclude with a response to actual issues and take a personal position vis-à-vis of the architectural profession.

Architectural positions and their epistemological approaches

Architects have always been set under pressure by the society which hoped that they could help in the improvement of life quality, but every generation responds differently mostly due partly to the available resources and partly to the existing technics available on that moment. Many architects (or group of) have tried to conceptualize *design as an epistemology* with the goal of influence other architects and urbanists. 'Design as epistemology (theory of design, the science of design) relates to the synthetic methodologies needed for a change...different from analytic methodologies, it relates to the methodologies of implementation'(Darius, 2007).

In his article 'The Architect and the Public: Empowering the people in Post-war Architecture Culture' Tom Avermaete (2010) distinguished different type of post-war architects and their different roles (syndicalist, populist, activist or facilitator) they have been played in their attempt to change architecture and the perception of the building itself.

'Across currents, styles, and idioms, post-war architects played the part of the syndicalist who questions the social status quo; of the populist who challenges professional conventions; of the activist who fights for spatial justice by transgressing the action boundaries of the profession; and of the facilitator who engages inhabitants to realize an ambitious individual project'(Avermaete, 2010).

'Syndicalist' position

After the WWII, modernist architects such the group GAMMA (*Groupe d'Architectes Modernes Marocains*) composed by Michel Ecochard, Georges Candilis and Shadrach Woods started to 'question the social status quo' by taking on the role of syndicalist whose primary role was to condemn the pre-existing dwelling approaches and advocated for 'an urban environment that stands out because of the symbolic power of its dwelling and building practices'(2010). Type such *bidonville*, which were seen as the sources of all evils, became the source of inspiration for a new 'proletariat' of the urban public space. The so-called 'syndicalist' architects plead for a new approach in which the architect should not try to impose his modernistic point of view but could provide a toolbox of concepts in which the public (according to GAMMA, public means the man in the street, the proletariat, the citizens, the suburban masses) 'could thrive' while keeping his way of living. The epistemic approach of those syndicalist architects was at the same praxeological and phenomenological. By condemning the then 'imposed colonial logics and its resulting dwelling conditions' and the negative perception of their CIAM fellows (phenomenological episteme) and by deeply studying the way of life (dwelling and building practice etc.) of those rural mass immigrants living in the slums (praxeological episteme), those populist architects managed to come out with new proposal in which the 'modern patterns of living' was integrated into the traditional culture of dwell.

'Populist' position

Other architects such Gordon Cullen and Charles Moore advocated for a different approach in which the expertise of architect as designer should be relegated back to this 'everyday culture' of the 'popular mass' and should not only look at architecture through the lens of 'pure design' but with a sense of populist who is ready to engage architecture 'with the taste and symbolism of the popular masses'. In his Article *Architecture and Popular Taste* published in the Dutch magazine Forum in 1958, Douglas Haskell went even further by advocating for an architecture which is adapted to the

then-upcoming 'era of popular mass consumption'. According to him the new task for the architect was 'to meet the desire of masses for more romance and popular decoration...' (Avermaete, 2010). This populist approach of architecture led later in the 60's to the famous 'Learning from Las Vegas' of R. Venturi and D.S. Brown in which (using the semiotic research approach by analysing signs and its relationships with the public (Avermaete, 2016)) they investigated 'a broad range of popular expressions of dwelling (landscape of course) environments'. For Venturi and Brown (Avermaete), 'the populist architect had to detect, analyze, and understand the use, iconography, and marketing of the popular vernacular environments'(2010). Meanwhile, the Smithson couple (and Team 10 in general) had a more phenomenological research approach of the role of the architect and the relationship between city and architecture. Alison and Peter Smithson had a different perception of the city than what until then was the norm in the '50s: the *architecture of the city*. They pleaded for a new approach of 'a city made out of architecture', a 'city of event' in which 'the building was no longer conceived as an autonomous, solitary object, but as a piece of fabric enmeshed in a web of interrelations: between individuals, communities and their daily routines, between use and territory, built fabric and social fabric'(Heuvel, 2014), in short what Alison called a mat-building. Of course, this phenomenological 'strategic apparatus' of giving a new path to architecture was also used by Aldo Rossi in his book *Architecture of the City* of 1966, in which he perceived the city as a 'collective memory' of own citizens.

'Activist' position

In the wake of social protests 1960s, a new group of architects and urban planners emerged with the aim of using their 'professional skills and abilities to bring more social and spatial justice' into the then prevailing post-war CIAM's rationalistic approach, responsible for the 'territorial divisions in terms of monofunctional areas, characterized by monotonous repetitiveness'(Hengeveld et al., 2008). As they adopted a kind of 'anti-industrial resistance' attitude, those activist architects and urbanists pleaded for a more traditional approach and even tried actively to influence the public by empowering the local communities. As episteme, they chose a typo-morphological approach by imitating 'the best preindustrial examples in their proportions, their dimensions, and their morphologies, their mode of production using traditional materials and craftsmanship' (Avermaete, 2010).

'Facilitator' position

In the essay 'Architecture's Public', published in 1969 by the Italian architect Giancarlo De Carlo, a new architect role was proposed as an alternative solution to the mass housing issue. He advocated for a more participative design process in which 'the life and the aspirations of the common man' should be considered by architects. According to De Carlo (Avermaete, 2010), 'all barriers between builders and users must be abolished, so that building and using could become two different parts of the same planning process'. This role of the architect as a facilitator for a participatory system was taken further by John Turner who advocated for an 'architecture without architects' because such self-designed neighborhoods worked better. To solve the uniformity of mass-produced housing, the Dutch architect John Habraken proposed a new role of 'an industrial designer' as a facilitator between the 'individual clients' and the production industries, thus between aesthetic and practicability. If Turner chose a praxeological episteme by an 'empirical studies of neighborhoods, De Carlo and Habraken approach can be seen as phenomenological because they both focused on the notion of perception and especially on how architecture was experienced by the public.

Contextuality vs universality

The biggest challenge for me (but also any other architect in any other context) is to identify the problem and to transpose it into an architecture related issue even if sometimes there is no direct relation between them. The identified problem, even universal, is always related to a specified context while the proposed answer can be not always related to the context. Even if the problem of water pollution on Marineterrein may meet the requirements of the client (in my case the municipality of Amsterdam wants for this area to be and remain a place where innovation takes

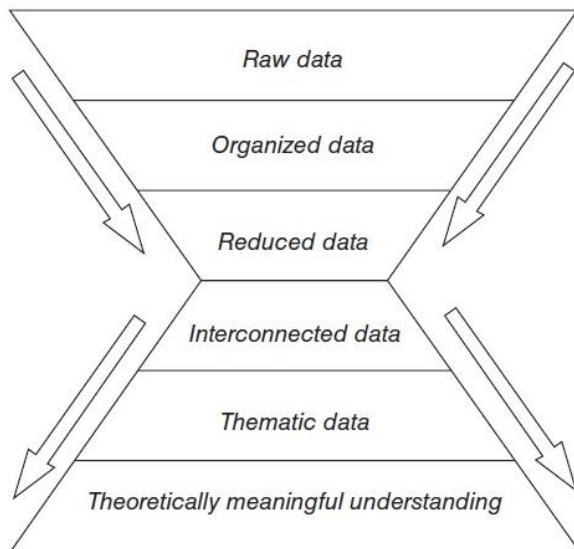
place), my response seems to be universal for the sake of necessity. As Herman Wagter (Marineterrein, 2017) states in his manifesto for innovation *Incubator for dreamers* 'here (on Marineterrein, we're laying the foundations for what people will encounter in the city over the next thirty years... products and systems that will replace outdated structures'. It is clear for me that Marineterrein must become a 'showcase' for ongoing sustainable innovations on the field of water as a kind of 'scaling for impact'. So as a designer of the era of computing design, I must be aware of this universality of my choices and the interconnected effects (climate, economic or political effects on society) they may cause if I don't think in a broad frame.

The main goal of my graduation project is the development of a new type of green façade which can actively help to solve the water pollution issue on Marineterrein. My answer to these issues could be global but most of all it must have a positive impact on its direct surrounding. As there are no precedents (buildings with an active green façade which can clean water) to lay on, case study research method becomes all most inefficient and thus for the interdisciplinary approach as much for research as for design.

Methodological research approaches

As Lucas (2016) states 'architecture has the advantage of being a relatively methodology-agnostic, or neutral, research discipline'. This advantage can sometimes be a handicap for the researcher as there are many methodologies which could be applied to my research question. In the research phase of my graduation project, different types of epistemes can be distinguished. The first one is a morpho-typological mapping of the different types of Constructed Wetlands (CW) system as part of the thematic research, meant to be applied on and around a building. Concomitantly morphological analyses took place and can be subdivided into two complementary research: a morpho-historical analysis (mapping and charting are the most used methods) meant to get in touch with the Marineterrein site and a morpho-physical analysis of the site mainly made by a biochemical analysis of the canal water and soil sediment. The last one is meant to test simultaneously the applicability and the effectiveness of the CW on the site and shows well this interdisciplinary character (literature study of water management, biological and chemical study) of our profession. The big challenge for me is the integration of the historical findings into my narrative. 'The researcher must also know how to arrange the evidence in an interpretative framework, and interpretation perforce requires theoretical commitments'(Wang and Groat, 2013). The second one is typological analysis conducted as a case study of architecture and landscape projects. The Choice of projects does depend on the type of the building but on the characteristics of its façade and/or its built environment as the place of phytoremediation. That implies clearly predefined requirements (green façade, greywater recycling, phytoremediation as water cleaning system etc.) to be more efficient in the research. Simultaneously a phenomenological research, conducted to understand the principle of phytoremediation, is essential for me to be able to transpose the whole principle into a façade design.

At the same time a research by design approach, conducted at the same time, is constantly shifting between big scale (integration of the building in its surrounding landscape) and the small scale (focussing on façade detailing principles) and seems to be more a deductive process than an intuitive one. In the design phase, a phenomenological and praxeological methodology (Avermaete, 2016) are needed in order to obtain a rational and functional spatial organization of the swimming pools (the covered one for the winter and the open-air swim spot for the summer) as the way they are used is different and users themselves may be different. In short, my methodological research approaches can be assimilated to a *Qualitative Data Analysis* (Wang and Groat, 2013) which must be collected, reduced and interconnected into a thematic data relevant and meaningful to my design.



Working with qualitative data: drilling in and abstracting out (figure 7.15) (Wang and Groat, 2013)

The new role of a contemporary architect

Research by design

In a contemporary world dominated by 'computer and controlled machines', the role of the architect has radically changed. The new architect or urban planner has become like a generalist who must have a lot of knowledge (sometimes more than basic one) from a different field (economic, cultural, technical, social, political) meant to be incorporated into his design to respond to his new role of reinventor of architecture. By reinventing architect profession, I mean the way architects deal with the whole research and design processes. Computer and computer-controlled machines have radically changed our way of dealing with architecture. Think of the contribution of 3D printers or CNC machine as design or production tools and all that implies in terms of knowledge for designers. Moreover, on that subject, Andrew Witt (2010) distinguished two type of knowledge: design knowledge (more intrinsic one) and geometric knowledge (more 'deductive and procedural requiring a 'synthetic understanding of design constraints').

'Machines, including computers, provide a way of encapsulating this knowledge in a more usable and repeatable way. Such machines raise certain epistemic challenges: they abstract systems and detach the user from operative logic, requiring more instrumental and less design knowledge' (Witt, 2010)

According to him, despite the advantages (such efficiency and reliability) that the 'analytic machines' can present, the risk remains that design knowledge 'encapsulated' by the computer and making us dependant on both our instrumental knowledge of the machine and on the machine itself'. The complexity of this instrumental knowledge can also be found in the whole architectural discipline. The same ascertainment can find in the work the philosopher Jan Bovelet (2010) who also note this tendency of 'conceptualizing drawing as a specific form of knowledge can be found throughout the history of epistemology, although it tended to be underestimated due .to the connection of knowledge with language..' (Bovelet, 2010). He sees the contemporary digitalization of our profession (CAD, CAM, BIM, GIS...) as an extensive digital habitat with which can represent a treat to the architectural design. For Nishan Awan & co (2011), 'architectural language..is extremely

codified, from the technical vocabulary of the profession, through to the jargon of academia and trade magazines...The teachers deliver architectural knowledge that remains in a defined and safe realm'(Awan et al., 2011). This sacredness of architectural knowledge may appear to students (like me) as an absolute and non-negotiable expertise and prevent them to break the boundaries and reinvent architecture by innovating.

Toward conclusions

Interdisciplinary methodological approach

Innovation in architecture asks a deep understanding of the existing building technics and production process and most of all being able to transpose them into a sustainable design that can improve the quality of the built environment. For that, a transdisciplinary (cross-disciplinary approach such chemistry, physics, biology, etc.) and cross-sectoral (social, economic, political) research process are needed to avoid friction between the different actors involved the building process. To be able to interact and communicate with all people involved in the building and process, the contemporary architect must adopt a new epistemological approach as *catalyzer* between the actors, whose primary role is to propose alternative and sustainable to actual issues. The new role of the contemporary architect is what I may call 'an inspired reinventor' of our profession who dares to step out his comfort zone of architectural knowledge searching for sustainable solutions or alternative ways of dealing climate change, housing shortage, even war. He must also be able to fit in the zeitgeist of the architectural profession.

In short, issues such demographic growth, water, air and soil pollution, depletion of building materials, energy, etc. make the architect profession more complex and ask for an interdisciplinary approach in the way of searching for solutions and design process. The evolution of building functionality over time has changed a lot. Except for its primary function of protecting against exteriors hazards, nowadays building façade must be more than sustainable (energy neutral, recyclable, lightweight, etc.), it must have a positive footprint and shift from a passive to an active building.

Example of an active façade is the bioreactor façade in Hamburg (IBA)).



Bioreactor algae fuel façade



(Source: archidaily.com)

References

- AVERMAETE, T. 2010. The Architect and the Public: Empowering the people in Postwar Architecture Culture. *Hunch*, no. 14, p. 48-63.
- AVERMAETE, T. 2016. Architecture and Its Epistemes: Lecture Notes for Students. 8.
- AWAN, N., SCHNEIDER, T. & TILL, J. 2011. Spatial agency : other ways of doing architecture. Abingdon, Oxon [England] ;: Routledge.
- BOVELET, J. 2010. Drawing as epistemic practice in architectural design. *Footprint*, 75-84.
- DARIUS, M. 2007. Design Methodology as a Migration from Analytic Methodology. *Design Management Review*, 18, 50-57.
- HENGEVELD, J., STRAUVEN, F. & BLOM, A. 2008. *Piet Blom*, Amersfoort ;, Hengeveld Publicaties.
- HEUVEL, D. V. D. 2014. The Event City of Dutch Structuralism. 4 ed. Amsterdam.
- LUCAS, R. 2016. Research methods for architecture. London: Laurence King Publishing.
- MARINETTERREIN, B. 2017. Marineterrein Amsterdam. Amsterdam: Bureau Marineterrein Amsterdam.
- SWENARTON, M., AVERMAETE, T. & VAN DEN HEUVEL, D. 2014. Architecture and the Welfare State. Hoboken :: Taylor and Francis.
- WANG, D. & GROAT, L. N. 2013. Architectural research methods. Second edition / ed. Hoboken: Wiley.
- WITT, A. J. 2010. A Machine Epistemology in Architecture. Encapsulated Knowledge and the Instrumentation of Design. *Candide* 53.