The European Association for Architectural Education (EAAE-AEEA) Subnetwork on Architectural Theory, gathered in Chania Crete in the summer of 2010, in order to focus on the collateral relations between digital/material and depth/surface. In that seminal meeting, titled "SURFACE/ΕΠΙΦΑΝΕΙΑ: Digital Materiality and the New Relation between Depth and Surface as a Challenge for Architectural Education," the invited group was asked to capitalise the findings of four previous work sessions held in Hasselt, Trondheim, Lisbon and Fribourg by applying methods and concepts as interpretive critical tools regarding the emergent digital architecture, its nature and effects in research, education and practice.

Following the SURFACE/ΕΠΙΦΑΝΕΙΑ events, the present book contains the revised views of the participants, as their contributions were written specifically for this volume. The book's theme acknowledges that there has been an important break in the polarity between depth and surface caused in contemporary architecture by the rise of a new digital materiality and tactility. Following a couple of decades of experimentation and a wide spectrum of enchanting applications of the digital, we have well reached the point we can no more either ignore and condemn it, or just celebrate and faithfully apply it. In a broader sense, this shift towards the surface of things as "the deepest side of the world" has to do with a wider socio-cultural change, which has been triggered by postmodern irony and the wish to revalorise all values.

The attempt was seen as an opportunity to revisit a field which, so far, had often been seen as something extraneous and contradictory, if not even hostile, to the origins and the traditions of architecture; an attitude the group willed to also problematise and situate it within its relative context. The two key-texts are unlocking the field by emphasising at either the anthropological-sociological or the technical-ethical challenges underlying the overall re-organisation of architectural merits. The five ensuing parts are organised thematically in a way covering historical, epistemological, technical, conceptual-perceptual and natural properties of the issue respectively.

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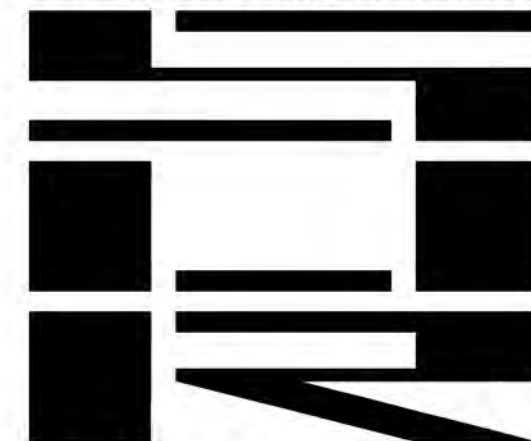
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ΕΠΙΦΑΝΕΙΑ

Digital Materiality and the New Relation between Depth and Surface

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TECHNICAL UNIVERSITY OF CRETE

This volume contains the final edited essays coming out of the European Association for Architectural Education (EAAE-AEEA) Subnetwork on Architectural Theory meeting in Chania, in September 2010.

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SURFACE/ΕΠΙΦΑΝΕΙΑ : Digital Materiality and the New Relation between Depth and Surface

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SURFACE/ΕΠΙΦΑΝΕΙΑ

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DATA-DRIVEN PRACTITIONERS: ARCHITECTURAL INVESTIGATIONS OF THE DIGITAL CONDITION IN THE NETHERLANDS

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I would like to start with a few remarks on the title of the conference. These remarks contributed to the eventual development of the character of my intervention and thus help me summarise my argument in its totality. My main point is that I discern a fruitful tension lying between the introductory text (i.e. the original call for papers) and the subtitle of this workshop. The introductory text seems to hail new hybrid constructions that take the place of traditional bipoles. At the same time it is calling us to discuss them in terms of yet another polar opposition. If that is the case, then the main challenge of this workshop could probably be the constitution of another 'hybrid construction' in the place of those persistent traditional poles of the subtitle. However, whereas the introductory text describes our current (mostly negative) attitude towards traditional poles of thought and practice, the sub-title insists that we should hereby discuss 'Digital Materiality and the *New* Relation between Depth and Surface *as a Challenge for* Architectural Education'. I read this as an implication that the framework of our discourse is yet another polar opposition of new (tools, concepts, media, technologies) with an architectural education that should somehow adapt to them, as if their relation to it is only alien and external, as if those new developments represent something that could not possibly be internally generated by the practice of architectural research and education. I would like to suggest that this is not the case: If there is a challenge here, it is exactly the thematisation of the complex relation of technology to education as we can witness it unfolding in practice, irrespectively of our conceptual or theoretical biases.

In other words, I would like to come to terms with the question: is the distinction of digital materiality to architectural education valid under the terms of the developments of digital materiality itself? I'm willing to argue that, in a certain sense, the answer is 'no' and, by doing so, I'm not really suggesting anything new. The underlying idea of this argument is at least as old as Marshall McLuhan's understanding of media as extensions of man or Donald Schön's resistance to the dominance of the technical rationality model of thought and the subsequent scientification

of diverse human practices that possess their own kind of knowledge (that is developed and reflected upon in action), and thus challenging the current hierarhically higher status of research, as opposed to practice. I do believe, though, that answering 'no' does not really exhaust the problem and there is a certain sense in which one could simultaneously answer 'yes', suggesting that there is much more to architectural education than digital materiality competing schools of architecture, for instance, if we are to pick out the most obvious example. Hence, the boundary of the opossitional poles may surface as rather blurry and impractical, meaning that the distinction upon which the subtitle of the workshop rests does not seem valid any more. In that case, we might possibly be better off if we moved to another intellectual territory, trying to enter the discussion through another perspective. Yet, the insertion of another kind of perspective is not really enough if it is not followed by a certain explanation of the causes that presently lead us to treat technological advancements and their accompanying concepts as external to the architectural domain. I would like to propose that there is sufficient reason for this phenomenon. I will then conclude this paper by briefly suggesting an interpretation of the significance of depth for architectural education in the age of the ubiquitous surface.

Instead of venturing off into the theoretical realms prescribed by those initial thoughts, I prefer to indulge in the concrete examples offered by the work of specific architectural practices of the last 15 years. Those will serve as milestones for illustrating the argument I have just outlined. I have chosen ONL and MVRDV as representatives of the breed of architects I shall call 'data-driven practitioners', for a number of reasons: First of all, because they share a cultural context, the common terms of which warrant the possibility of a thorough comparative analysis of their work. ONL and MVRDV both embrace the digital condition as a constitutive part of their work and they are widely regarded as pioneers in the field. Their common commitment to practice through research, as well as the fact that they are both members of architectural education institutions were additional factors that contributed to this choice. Last but not least, ONL and MVRDV happened to exercise a great impact in the previous years thanks to the extroversion of Dutch (or even Super-Dutch) architecture, especially in the wake of the global impact of the work of OMA[1].

[1] Cf. Lootsma Bart, *SuperDutch. New Architecture in the Netherlands*, Princeton Architectural Press, New York 2000.

Architecture as a data-driven practice

While ONL and MVRDV's architectural investigations of the contemporary digital condition may form part of a complex

web of relations (to which we shall return towards the end of this paper), they both focus explicitly on two main topics: They attempt to redefine building at large by moving in the general direction of a digital materiality that is nevertheless interpreted quite differently in each case. At the same time, they also thematise the status of the architect and his role within the design process. They both describe the architect as a data-driven practioner working amidst a global flow of information within a yet again somewhat different in each case collaborative design environment. A comparative reassesment of their work serves to outline their specific differences, while bringing forth two distinct approaches to the interrelations of architecture with the digital condition.

ONL's approach is holistic in its scope. It goes as far as proposing a new ontology suitable for architects and their work in the era of the digital flow of information. The fundamental particles of ONL's ontology, which transgresses the virtual-to-real continuum, are infons i.e. information particles describing 'all matter and energy [...] as a specific state of information'[2]. The life of the building does not begin at the moment of its physical construction, but at that of its conception in digital space. Incepted there, it keeps extending and evolving in a digital-to-material continuum. The digital nodes that control the interactive behaviour of the computer model are actualised in pneumatic or hydraulic hybrid constructions, whose behaviour continues to be governed by the same nodes. That is why a whole project can prove to rely on just one detail, that is the key to the whole design and construction process.

Unlike MVRDV and their 'datascapes', Oosterhuis does not concentrate on the exhaustive pursuit of the most extensive set of available data. By reducing our everyday relation with space to an exchange and computation of data between two equally active agents, ONL translates our everyday behaviour to programmable rules and scripts that govern modes of human interaction with an architecture that adopts and embodies digital media in its construction at an increasing rate (thus, the building becomes an 'e-motive hyperbody'). Each design project, constituted by a sum of information (i.e. significantly organised sets of data), gains its own ontological status and emerges from the coexistence of different parameters which evolve and change as they are affected by every kind of independent factors (from climatic conditions and general building regulations to the current capacities of available software), much like a swarm of birds. Collaborative design is in turn an entity at least as distributed as the design project it helps to develop. Designer and project thus share a peculiar status that is characterised by its emergence

[2] Oosterhuis Kas, *Hyperbodies: Towards an e-motive architecture*, Birkhäuser, Basel 2003, p.26. The presentation of ONL's approach to architecture that follows is largely based upon this work that still serves as the most systematic summary of Oosterhuis' vision of the data-driven practitioner to date in the absence of his forthcoming book *Towards a New Kind of Building* (2011) at the time of writing these lines.

from the independent action of individual agents. The possibilities of collaborative design offered by the digital condition can only flourish in a new form of proto-space, a kind of design hub that facilitates and encourages the interactions between the experts from different professions (architects, engineers, construction managers, software programmers etc.) that form the design swarm of the building.

By building protospace prototypes, Oosterhuis is in fact investigating the problem of construction of hyperbodies. He has thus ensured the development of his research through materialised experimental constructions, while also developing the structures that will facilitate the fulfillment of his vision of collaborative design of an interactive architecture. His experimentation in construction goes hand-in-hand, and is constantly interacting with, his theoretical endeavours. This means that, in this case, digital materiality is not just a challenge for architectural research or education, but it is also driven by it. When one looks at Hyperbody Group's recent experimentations with small sections of interactive architecture, it seems as if the full scope of Oosterhuis' vision for interactive Architecture is just a matter of scale and time. At the moment when file-to-factory techniques of construction will have become the norm and prevail, our cities will no doubt turn interactive, fine-tuning themselves to the wishes of their visitors[3]. The holistic character of ONL's approach shows that there is nothing new or challenging that digital materiality poses to architectural education. In fact, they evolve in parallel when one acts within a community that accepts the terms of digital materiality, accepts to become part of the situation at hand, interacts with it, attempts to change it and reflects upon the results and their implications, keeping the inquiry moving at all times[4].

From their definition of architecture as interface[5] to that of architecture as a device[6], the digital is gradually penetrating the work of MVRDV so as to serve the design research. The result is a gradual production of software as an aid to the design process. Starting off from the concept of the 'datascapes' that is already present in the pages of *FARMAX*[7], MVRDV's trajectory culminates in their collaborations with software development companies for the production of design applications ranging from the likes of *Functionmixer* or the *Regionmaker* to their most recent *Spacefighter* that is supposed to be the game that can help train an architect to develop the skills needed to confront the complex design challenges posed by the contemporary 'Evolutionary City'[8].

Since 1999, MVRDV have been interested in the way in which

[3] Oosterhuis Kas & Schueler Nora, "Fine-tuning the city", in *Athens by Sound*, Karandinou, Achtypi & Giamarelos eds., Futura, Athens 2008, pp.92-4.

[4] Cf. Schön Donald A., *The Reflective Practioner. How Professionals Think in Action*, Basic Books, New York 1983, p.136.

[5] The definition of architecture as interface appears in the opening sentence of MVRDV, *MVRDV at VPRO*, Actar, Barcelona 1997, p.3.

[6] Cf. Winy Maas, "Architecture is a Device", in MVRDV, *KM3: Excursions on Capacities*, Actar, Barcelona 2005, pp.36-45.

[7] See Winy Maas' short complementary texts, titled "Landscape' and 'Datascape", in MVRDV, *FARMAX: Excursions on Density,* 010 Publishers, Rotterdam 1998, pp. 94-7, 98-103.

[8] The concept of the 'evolutionary city' surfaced in MVRDV, "Evolutionary City", in MVRDV, *KM3: Excursions on Capacities*, Actar, Barcelona 2005 , pp.1250-7. It was furtherly developed in MVRDV/DSD, *Spacefighter. The Evolutionary City (Game:)*, Actar, New York 2007.

[9] Cf. MVRDV, *Metacity/Datatown*, 010 Publishers, Rotterdam 1999.

'datascapes' are formed by the flow of information on a global scale, becoming able to set their own conditions to design[9]. The primacy of the aesthetic is rejected in favour of the formation of a built interface of the digital global with the local. Diagrams and statistical analyses of information collected from its horizontal diffusion in digital networks are enough to produce extreme-case scenarios as well as provocative planning predictions mainly concerning the density of our future cities through a simple extrusion in the third dimension of diagrammatic statistics (a kind of "concretisation" of information).

Yet, in their built work MVRDV never seem to resort to the sort of experimentations with sensors and interactive behaviours Oosterhuis does. Their approach to building remains largely tectonic, following the established norms of the Dutch construction industry. In the case of their built work, the assimilation of datascapes is their way of horizontally informing the design process of a mostly conventional construction. The quest for the largest available set of data for each particular project and its subsequent translation to diagrams and statistics, which often also become the formal fundamentals of the final built work is the MVRDV approach to collaborative design. Their approach to research produces tools that fill the empty slots of a contemporary toolbox of architectural design that is willing to work with the opportunities offered by the diffusion of digital information. However, this gap between research of the design process in the age of the digital and their built work shows that there is a way in which digital materiality does not really exhaust the question of architectural education, since building follows another path that is partly informed, but also partly independent from the methodology of the digital design techniques and their application. This gap seems to form the entry-point to the significant reappearance of depth in the age of ubiquitous surface.

Data-driven practice as a plea for an architecture of meta-modernity

The possibility of answering both 'no' and 'yes' to the initial question of whether digital materiality poses a challenge to architectural education seems to be revealing it as a problem of our stance or disposition towards it. In other words, our problem is not a given. It is rather formed by our own contribution to it. I would hereby like to resort to Schön's 2 kinds of practitioners' reflection:

a. reflection-in-action ('reflect[ing] on practice while [being] in the midst of it'): 'When someone reflects-in-action, he becomes

a researcher in the practice context [...] He does not keep means and ends separate, but defines them interactively as he frames a problematic situation [...] Because his experimenting is a kind of action, implementation is built into his inquiry'[10]. This seems to be Oosterhuis' typical holistic way of working in the context of digital materiality.

b. reflection *on* their knowing-in-practice ('think[ing] back on a project they have undertaken' and 'explor[ing] the understandings they have brought to their handling of the case')[11]. This happens quite extensively in the work of MVRDV and ONL. They even restructure the narration of their work-to-date, organising it under categories of design techniques that feature prominently in their work, when realising that they can possibly serve as starting points for further exploration of future cases[12]. This procedure is in fact an assemblage of a toolbox within an already established realm of practice and contributes to the articulation of the overarching theory of the practitioner's design decisions. It can also serve as a first step towards the critical reassesment of that theory and the starting point of a discussion with other contending schools of architecture. Schön's approach sheds light on the question of the kind of research, practice and reflection MVRDV or ONL may embody. It can also function as a plea for reflection upon the frames and the overarching theory that governs their work, defining the commitments they share with a certain school of architectural design.

Although MVRDV's rhetorics usually insist on the liquification and uncertainty of our contemporary condition, probably intending them to serve as a psychological boost for unbounded creativity, their data-driven practice is developing in the no less safe grounds of the same Technical Rationality that undoubtedly governs Oosterhuis' more self-affirming work. Although their extensive data-collecting, as well as their motto: 'Everyone is a city-maker', is part of their attempt to enable the citizens themselves and their attitudes to inform the design process of an urban intervention, their involvement remains indirect, mediated by the observable data and the digital traces people produce through their everyday endeavours. However open it may be, their approach continues to rely heavily upon technical analysis. The important question here is whether the data-driven practitioner can work with surprise. MVRDV and ONL seem at times to believe that it is exactly a data-driven parametric design practice that is the generator of surprise, stemming from the computer's capability to manage and process complex data-sets in real human-time. For MVRDV, surprise is already there within the information carried by the data, the articulation of which could lead to its revelation. Yet, that is not exactly the kind of

[10] Schön, 1983, p.68.

[11] Ibid.

[12] See, for instance, MVRDV's *KM3: Excursions on Capacities.*

surprise we are looking for here. Although it shares with it the feeling of the unexpected, it never seems to escape the range of the fixed given categories used during the data-collecting. People are not really and actively involved with an intensive awareness that they are part of the situation they are facing, that could really boost the social transformations MVRDV's essentially technical analysis may prescribe. In this case, data-collection becomes a sort of excuse on the part of the expert designer, an illusion that users-clients do participate in a design that is basically industrially or technically-driven. In the attempt to open to a sort of synthesis, the approach easily gives in to a reductionism, that largely goes unnoticed exactly through a lack of reflection in practice.

This is exactly what I think is also happening with our notion that technology somehow intrudes our profession and poses challenges to our education. Only when we can relate to digital materiality or any other conceptual change we think technology inflicts upon us as a product of our own design intentions that itself forms a situation that back-talks to us can we escape the fundamental dichotomy rooted at the subtitle of the workshop. ONL's practice is a good exemplification of this stance. Avoiding the substantiation of technology as something 'out there' that intrudes our practice and treating it instead as something that is internally and interactively generated by our own practice within the contemporary condition is another step in our ongoing journey towards a more explicit understanding of the surface as 'the deepest side of the world' and help us pose the supplementary question of an architectural education that is itself challenging digital materiality and the relation between depth and surface.

But, as we have already seen, that does not really exhaust the question at hand. This should not lead us to believe we should be rid of digital materiality and the technical rationality that is intertwined with its development, in the way that Schön sometimes seems to imply. I don't think that our current situation enables us to exit or oppose modernity in the polemical way of a sometimes naïve post-modernism. We should instead treat it as revealing yet again the multifarious nature of our discipline and as an urgent need to deepen our understanding of our contemporary condition and its relation to modernity. I would like to conclude with this kind of plea for a meta-modernity: It would then be time to return to the complex web of relations that contextualises the Dutch architects' development and the depth of their relation with modernity, in order to advance our understanding and our relation with digital materiality and architecture as a data-driven practice.

Having practically reached the conclusion of this paper, I would now like to hint to topics of such further inquiry[13]. ONL and MVRDV are actually following on the tracks of the epistemological project firstly articulated by François Lyotard in the early days of the post-modern situation. Both practices were never associated with post-modernist architecture in the way of Charles Jencks, neither with deconstructivism. MVRDV are more or less modern radicals, constantly giving literary meaning to our metaphors for the city in a way that could possibly be expanding the 'hidden agenda of modernity', the cosmpolis of *KM3*. ONL's approach is in fact in contemporaneous dialogue with Greg Lynn's concept of the animate form, proposing instead the notion of the animate body, while maintaining conscious relations with Le Corbusier. Today, ONL meets Hadid's and Schumacher's recently articulated parametricism who also understand themselves as descedants of modernism, distantiating themselves from post-modernism and deconstructivism[14]. Oosterhuis' relation to modernism can be traced in his rephrasings or recontextualisations of some traditional definitions of architecture (like Le Corbusier's 'masterly, correct and magnificent *play of volumes* brought together in light' Oosterhuis' master is now an 'idiot savant' computer and architecture is 'a multi-player game') or in his resorting to modern-day automobile design when attempting to define emotive design[15]. His recently uncovered deepest concern about architecture rests on undoubtedly classical grounds, though, of Vitruvian origin. In a 2009 blog entry, he is wondering whether interactive Architecture can be beautiful (since it is already standing and functioning as a construction)[16]. More recently, he seems almost reluctant to call his work 'architecture' in the title of his forthcoming book (echoing Le Corbusier again) *Towards a New Kind of Building.[A Designers Guide for Non Standard and Interactive Architecture]*. These feelings that develop within our modern predicament, stemming from one of the pioneering forms of a data-driven practice need to be articulated if we are to gain a deeper understanding for an architecture of meta-modernity.

[13] In addition to the following, Socrates Yiannoudes' paper in the present volume may also be read as another indication of the kinds of directions for further research that could be encompassed by this plea for meta-modernity.

[14] See Hadid Zaha & Schumacher Patrick, "Parametricist Manifesto", in *Out there: Architecture beyond Building. vol. 5, Manifestos, 11th International Architecture Exhibition La Biennale di Venezia,* Marsilio, Venice 2008, pp.60-3.

[15] See Oosterhuis, 2003, especially pp.30-1, 72-3.

[16] 'My question will always be: can iA be beautiful? It is certainly necessary and functional, but can it compete with historic architecture and be appreciated as good, relevant and beautiful? I believe that it can': Kas Oosterhuis iA blog entry edited on March 10th, 2009 found in http://www.bk.tudelft.nl/live/pagina.jsp?id=771c1b4c-39ee-41e9-a197-990b3ace02b5&lang=en [accessed: August 2010].