Digital leadership

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Leadership is an important quality in organisations. Leadership is needed to introduce change and innovation. In our opinion, in architectural and design practices, the role of leadership has not yet been sufficiently studied, especially when it comes to the role of digital tools and media. With this paper we intend to initiate a discussion in the eCAADe community to reflect and develop ideas in order to develop digital leadership skills amongst the membership. This paper introduces some important aspects, which may be valuable to look into when developing digital leadership skills.

Keywords: *digital leadership, research by design, creative practice, design research, impact*

INTRODUCTION

Digital tools are part and parcel of contemporary practice in architecture and in the academic environment. Everyone is aware of the potential of tools such as parametric design, Building Information Modelling (BIM), generative design, and so on. High-profile projects such as the British Museum Great Court, Smithsonian Institution Courtyard roof, Beijing New Airport Terminal Building, Arnhem Central Transfer Hall, and so on could not have been realized without such technologies. Characteristic for leading offices that are pushing the envelope of architectural design is that they have an integral view of the architectural design and the digital tools that enable such design - we would call this "digital leadership."

In this position paper we outline a number of relevant aspects related to "Digital leadership." We hope to derive from this a first attempt to define digital leadership, but we are well aware that this very new concept can only be developed through collaborative effort between academic and practice partners.

IMPACT

This section is focused to the digital leadership impact potentials at diverse levels and scales. The leadership position, when achieved, seeks for and offers a high level of impact on the society - in its essence. This impact includes a better transfer of knowledge between sectors and disciplines, stronger networks. Which leadership styles are most effective in this

sense, appropriate for the contemporary society and in diverse socio-cultural settings?

The shift from the creative applications of digital tools and communication interfaces towards leading the development of the digital initiative and support of the design process, from responding to driving, changes the impact flow essentially. The impact from the digital is shifted to the impact on the digital realm - and far beyond. The digital realm may become design-led but still and even more powerful. The integrated power of the creative research/practices within the diverse digital domains seems to potentially create an important impact on the society as a whole.

The knowledge collected in a digital database is highly specialized and still distributed (Kocaturk and Medjdoub, 2011) rather than integrated. How can the idea of the digital leadership impact the essential knowledge integration? It offers a wider view, missing in the last decades of architectural computing. This wider view is also a potential for a wider impact. To the communities of practice and research that we cannot even imagine.

However, the identification of the potential and actual impact of digital leadership is not as easy as it seems on the first inspection. What is shareable/-transferrable from/to design research through practice/practice based research (Rendell, 2004; Osterle and Otto, 2010; Koskinen et.al., 2011; Schaik and Johnson, 2011; Verbeke and Zupancic, 2014) and how? How/where can we find the initial and also the longer-term evidence of the added value of what we are doing for diverse communities? How to find and monitor the evidence of the quality of the impact? The shift to social science research is essential here. We are far from the potentially misleading calculations of the 'impact factor' from the research dissemination databases...

The initial questions to identify the (potential) impact are: Who/how/with what do we want to address? How can we develop the arguments about the relevance of what we are doing, especially in the case of a high level of research singularity? Where and how do we seek recognition (Hatleskog, 2015)? How do we identify recognition in relation to the topic discussed? How can we change the community where we are able to identify recognition? How is this related to the media we use for communication? Who can we address if we change the communication mode?

MEDIA

How do we communicate the design ideas with ourselves and with others? Who are these others - in the case of digital leadership? How can we achieve the leadership position in relation to the flexible and responsive media use and development?

The studies of design media have already shifted from the obsession with the digital to more heterogeneous inclusiveness of the diverse analog options. On one side the development of the BIM modeling (intended for professional collaboration) and the potential of rapid prototyping both clearly lead to the sculptural way of thinking about architecture. Architecture becomes a pure object, a sculpture, a monument. The dimensions of the spatial contextualisation often move to other areas, to landscape architecture, to painting... This is the consequence in the cases where the cognitive visualisation is used more for the discussion with clients and general public (in urban design) than for the self-reflection within the design process. How can we overcome these tendencies?

Some further questions: How the use of media influences the design thinking? How do we choose and develop the media in relation to the way we think? What drives the main media flows, what are the triggers of the changes (Holder, 2015)? How can we start the leading position in this process, being aware of the potential shifts within the design thinking, that originate from or lead to the media development? How can we lead the public behaviour of creative practices through the media development?

RESEARCH BY DESIGN

Based on the work of Henk Borgdorff (2010), EAAE produced the following definition of research by design:

"In architecture, design is the essential feature. Any kind of inquiry in which design is a substantial constituent of the research process is referred to as research by design.In research by design, the architectural design process forms a pathway through which new insights, knowledge, practices or products come into being. It generates critical inquiry through design work. Therefore research results are obtained by, and consistent with experience in practice."(www.eaae.be)

Following the Frascati manual, research and experimental development is creative work undertaken systematically to increase the stock of knowledge-including knowledge of humanity, culture, and society-and the use of this stock of knowledge to devise new applications (OECD).

The crucial aspect is that knowledge can be emerging or produced through designing. This is in line with the work of Donald Schön (1983) who stimulated practitioners (including but beyond design) to actively reflect on their activities (design or other) and to consolidate these reflections into more explicit knowledge. There reflections can be on two levels: a) on the use of digital tools and environments to contribute to a better design and b) on digital tools to support the development and sharing of design knowledge.

Within digital leadership, it seems beneficial that digital leaders act on three levels: a) stimulate members of the organization to consolidate knowledge from their individual activities; b) consolidate and share knowledge within the team or group to develop a deeper understanding and c) brokerage knowledge between members of the organization but also bring external knowledge into the organization.

The main questions, which are then arising, include the following: which (digital) tools can help members of the organization to develop and share knowledge? Which knowledge processes need to be facilitated and stimulated in order to learn from the use of digital tools for designing? Which Which knowledge processes need to be facilitated and stimulated in order to develop knowledge form the design activities? Which skills and competencies are needed for a digital leader?

INTEGRATIVE KNOWLEDGE

As described in Verbeke (2013) it is explained there are many forms of knowledge which are all important for our actions and understanding of the world. In Verbeke and Glanville (2006) it is stated that knowledge is much more than the traditional understanding of explicit written-down knowledge. Tacit knowledge is discussed since Polanyi (1966). The distinction between mode 1 and mode 2 knowledge was introduced in Gibbons et al. (1994). Effable, embedded and embodied knowledge are frequently used to indicate specific types of knowledge.

Integrative knowledge is developed while identifying, connecting, synthesizing and demonstrating knowledge and skills that are gaining from all areas of life, in our case more specifically in the field of digital technology and architectural design.

In Peet et al. (2011) it is concluded that focus on integrative knowledge leads to increased capacity to: 1. identify, demonstrate and adapt knowledge gained within/across different contexts; 2. adapt to differences (i.e. in people and situations) in order to create solutions; 3. understand and direct oneself as a learner; 4. become a reflexive, accountable, and relational learner; 5. identify and discern one's own and others' perspectives; and 6. develop a professional digital identity.

While designing and while directing developments, it is crucial to combine and integrated different types of knowledge. It is well known that a field developed when implicit and explicit knowledge both develops and interact with each other.

For a digital leader, it then becomes important to be able to manage these different types of knowledge and to be able to integrate them in activities,

innovation and development. But, how to do this? Are there heuristics? Are there specific ways for doing this? For facilitating that knowledge get integrated. That knowledge form different fields and disciplines gets combined and integrated into new ideas and designs? What skills are needed to facilitate such processes? Which role can a digital leader play in architectural offices? And how can the variety of experiences by brought together to develop a deeper understanding and contribute to better designs?

DIGITAL DOMAINS

Leadership in design originates from a keen understanding of all aspects of design. Digital leadership is not different in this respect. The complex nature of design makes it impossible that any advanced level of design can be obtained through digital means only. Therefore, a "digital leader" not only has knowledge and mastery of digital techniques, but also of process management, materials, analogue techniques, and so on that we can find in design leaders as well. What stresses the "digital" in digital leadership however, is an acute understanding how "digital" can be a unifying set of methodologies and technologies to bring skills and knowledge together.

Computers have been used in architecture for about six decades. Throughout this period there have been a lot of developments, not only in computer aided architectural design itself, but also in architecture (the application area of CAAD), information & communication technology (the base technology for CAAD), and society itself (the context in which architecture unfolds). Major advances have occurred in Human-Computer Interface (the ease by which architects can use CAAD), visualization, complexity and size (the degree to which comprehensive models can be built), data exchange (to support information exchange between experts), reality capture, adapting software (through scripting languages like Grasshopper) and output to reality (rapid prototyping and design-to-production pipelines).

Despite these advances there are also still areas where progress is lacking. Architects are still slow to pick up simulation technology in design; the conceptual design process and hence it's support remains largely unclear; the same applies for collaborative design; BIM has yet to reach maturity; reliable costing is still far way; and sustainable and safe designs and processes have not yet been reached.

The most dominant technology to integrate design in a comprehensive format is Building Information Model. BIM is based on the long-standing vision of a shared data and process model formulated as early as the 1970'ies (Eastman 1980; Kalay 2004, pp. 66-68). Whereas early visions included all phases of the design process, BIM today is geared towards production of final phase documentation - a task which is of high complexity but occurs after most design work has been carried out. Pushing design and digital technologies forward then, does not rely solely on BIM but on a wide range of additional software and techniques. It is in particular in the selection of relevant techniques within a proper framing (Schön, 1983) that the most interesting advances are made.

Within Schön's understanding of design as a series of naming - framing - moving - evaluating, the design process takes on a guided bottom-up approach. By naming the architect sets the boundaries of the current issue in design; framing sets the actual problem and way of thinking of the problem - these two steps influence the choice of (digital) design technology. By moving the architects creates one or more design solutions - with creating also meaning generating through some digital tool if necessary, followed by evaluation to check whether the process is going in the right direction. This process is not completely bottom-up as this would imply ad-hoc reaction to problems as they become apparent, but it fueled by experience and top-down set goals.

There is not one single selection of digital domains that gets the job done. The skill of the digital leader lies in a confident and fluent command of several design techniques (digital or not) that best fit the current and overall design strategy.

LEADERSHIP

Leadership is a term that originates mainly from organizational sciences. There is a great amount of research on the aspect how leadership is compounded of interpersonal skills and managerial skills (de Vries, Bakker-Pieper and Oostenveld, 2010), but the amount of research on leadership in a design context is almost non-existent. Pahl, Badke-Schaub and Frankenberger's (1999) review of 12 years interdisciplinary empirical studies of engineering design in Germany shows that leadership in design is not well understood.

Leadership is often viewed as a negative thing, where a person is perceived as dominating and setting a course without consideration of others. In design, where often results are achieved through teamwork, such attitudes may have an adverse effect on the quality. Lee and Cassidy (2007) discuss leadership in industrial design - they identify among others "the leader as a catalyst of organization change" which seems to be the closest to a "digital leader." The list of good leadership traits at the end however, includes mostly interpersonal skills (personal characteristics, maintain friendship, attitudes and values, leading styles, and proper roles). This list stresses the team player aspect of good leadership.

Adams, Daly, Mann and Dall'Alba (2011) stress strategic leadership in particular in cross-disciplinary team. More specifically, among others they identify the ability to "making or enabling conceptual connections" and "facilitating systems-oriented strategies or frameworks that leverage diverse perspectives" as important factors for leadership success. It is precisely in this area of speculative and multifacetted work that digital leadership operates as well.

In a managerial context the only example we can find is described in Buhse (2012). Buhse stresses agile management as an important building block for successful Enterprise 2.0 business model, including aspects like team-based formulation of agenda, goals, and strategies. He sees the digital leader as moderator, bridge builder, and network organizer rather than classical top-down manager.

We define in our workshop "digital leadership" on two levels: (a) a particular skill set of a designer that allows him or her to push the frontiers of design - therefore on the individual level - being a digital leader by example; (b) a particular skill set of a person to advance game-changing technologies in a design team or organization - therefore on the organizational level - being a digital leader by team effort.

CONCLUDING TEXT

This paper initiates a discussion on the role of digital leadership in current architectural practice and design. It introduces 6 key elements: impact, media, research by design, integrative knowledge, digital domains and leadership itself. These elements should be seen as a start of further research on skill, competences related to digital leadership and how we can understand and use these skills in practice.

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