ON THE POSSIBILITY OF A NEW APPROACH IN LEARNING BY DOING IN A DIGITAL AGE

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ABSTRACT:

This paper primarily questions the possibility of a new approach in experiential learning in a digital within the framework of design. It takes the idea from its original conception, and traces its evolution in Bauhaus tradition, as well as new interpretations specifically after the advent of digital technologies down to present day by highlighting the problem of integration of digital technologies to design, specifically to experiential learning. The study finally proposes a framework questions to work with; towards a new approach in learning by doing in a digital age; a holistic view that will on the one hand honor our great traditions of design pedagogy and ages of wisdom, on the other hand, celebrate and make a non-pseudo-utopian, nondeterminist use of the technologies brought about by the digital age.

Keywords: Learning by doing, Experiential learning, Design pedagogy, Bauhaus, Digital design

1. INTRODUCTION

Throughout the last century, scholars and design theorists tried to theorize design and how to teach it; by providing models they tried to explain, and sometimes give directions to the way we design and the way we teach it. Among these, Bauhaus was not only the most popular but also the most influential. Even today, if we are to discuss design education it is very hard to do without reference to the theories of this school. Surely valuable, by nature, Bauhaus was also the product of its own era and formed with reference to the conditions within which it was flourished. Today at the beginning of the twenty-first century, the situation and the conditions point that we need to develop more appropriate models and theories /approaches for design education that integrate designerly action with the new features provided in the digital technology.

Although a certain inheritance persists, experimental learning (learning by doing) and teaching in architectural design are struggling with numbers of issues related to digital technologies. Seeking a way out, today's learning environments typically respond in a twofold (active-passive) manner.

1) More actively, we are either trying to adapt/transform our design education with reference to newly arriving technologies, or trying to develop new theories from scratch with a primary emphasis on

digital technologies. In the case of architecture, first position brings to core an insider critical look. It necessitates focusing on especially the Bauhaus impact on the design curricula of our schools, and its approach on crafts, experimental learning, hands on techniques, material-focused understanding , and foregrounds the idea of reconsideration of a tradition of doing design as the Bauhaus model provides us. Second position, leads us a rather outsider look and emphasizes different disciplinary gazes towards architecture. Such an approach foregrounds importation/adoption (not adaptation) of new techniques and technologies and tries to cope with the problem without reference to previous paradigms. As it was put by Oxman (2006, p.229) "…highly mediated design is beginning to evolve unique design methodologies, unique forms of design interaction and unique formal content." Here one can mention about diverse publications and approaches exploring the possibilities and potentials, yet no major theory or paradigm; it's all bits and pieces at its present stage.

2) On the other hand, passively, without an active control of a major theory, digital technologies are already changing the way we see design and the way we teach it. Yet it gives design an experimental, blindness via changing our actions ways of conceptualizing materials and procedures. Although blind, the value on this is that it provides us a set of unexpected experience.

2. THE PROBLEM

In both cases, we are confronted with the new conditions of our era in a great extent governed by the new digital technologies. The fast transformation which we are witnessing today leads us to ask whether we are losing primacy of doing in design as we know it. If one approach is to make a surf ride on the tides of the digital, the other is trying to clarify the blindness in the context of a digitally motivated design atmosphere. Intending to take the second route, the focus of this paper is to seek ways to adapt our design education without losing the essence (read: crafts, experimental learning, hands on techniques, material-focused understanding) while confronting to the conditions of the changing environment of digital age.

3. LEARNING BY DOING: THE CRADLE OF THE IDEA

Learning by doing is often defined as a process of learning by direct experience where the learner is expected to develop not only knowledge and understanding but also skills and values from that process as contrasted with formal classroom instruction or learning from books. We can trace the idea back to the early 19th century: The idea's original pedagogical inception could be easily attributed to so-called *kindergarten movement* flourished in the works of Johann Pestalozzi and Friedrich Fröebel. It is on account of Fröebel (2009, p. 11) that we have a pedagogical model marked by playing and experimenting with certain set of gifts with which children "stir up… awaken, and … strengthen, the pleasure and power of the human being to labour uninterruptedly at his own education," in Rubin's (Rubin, 1989, p.25) words, as opposed to "force growth by injecting or grafting information."

Despite the fact that, Fröebel and Pestalozzi's works represent the cradle of the idea of learning by doing, we owe much to the studies of scholars such as John Dewey, William James, and Jean Piaget whose works are the foundations of our present understanding of learning by doing, among which

Dewey is often interpreted as the main figure who manifestly articulated the idea within the modern (Ozkar, 2007). Dewey's (2011) basic contribution was established upon his critique of "traditional" education which he believed was against the nature of children's learning. It was a "from above," or "from outside" approach where children were taken as passive subjects, and many times distilled, categorized, solidified knowledge is supposed to be instructed, or better, injected inside their brains by the teachers or through textbooks (Dewey, 1938). Contrarily, he believed that there was a little value in walking along an already beaten path, with all that rules, and guidance, what we should seek is the "expression and [self] cultivation of the individuality …free activity …learning through experience … acquisition of …skills and techniques… as means of attaining ends …making the most opportunities of present life … [and] acquaintance with a changing world" (Dewey, 1938).

4. BAUHAUS' INTERPRETATION: CRAFTS AND THE STUDIO

What makes Bauhaus so important is that the school provided us a special interpretation and adaptation of the idea of experiential learning. In its adaptation to the fields of architecture and arts, they not only transformed the idea itself, but also added new components to incorporate with the idea and to further support it.

Bauhaus' emphasis was on the crafts, and the architect/artist was seen as essentially a craftsman. In his well-known Bauhaus Manifesto, Walter Gropius, the principal founder of the school, called for "Architects, sculptors, painters [to] …return to craftsmanship." He argued, "… in rare moments of illumination beyond man's will, may allow art to blossom from the work of his hand, but the foundations of proficiency are indispensable to every artist. This is the original source of creative design." The manifesto resulted in a call for a creation of "a new guild of craftsmen" (Gropius, 1919). In formulating this, Bauhaus put experiential learning at the core of its education as opposed to "conventional" paper based approaches and as opposed to learning from books or lectures. Gropius (1955) claimed, "Paper has become too exclusive a medium of exchange. The book and the drafting board cannot give that invaluable experience gained by trial and error in the workshop and on the building site." For the new pedagogy, a hands-on experience with the materials and the tools was essential and by experimenting with materials and tools students are expected to acquire knowledge and language of form and tectonics those were necessary for expressing ideas. The strong emphasis on the crafts and craftsmanship was clearly a displacement of focus within the original idea of experiential design which, as it was argued by Reyner Banham (1989, p. 287) the proponents of Bauhaus possibly took from Fröebel and from already established tradition of *Kunstgewerbeschule* workshops. This second lineage helped them to introduce a new component as an indispensable counterpart of hands-on experience in design education: the workshop (or if you prefer; the studio).

5. DON'T DISSECT THE FROG, BUILD IT: WHAT DOES DIGITAL AGE BRING TO US?

In a sense, Bauhaus was the product of the conditions brought by so-called industrial revolution and the industrial age (or, First Machine Age *a-la* Banham). In a not so distant future, about the end of the

first half of the 20th century, world was about to meet a new one: so called digital age (or First Digital Age *a-la* Oxman). It is no surprise that the phrase digital age is often used interchangeably with information age and computer age, as it was initiated and proliferated basically by the advances on computer technologies and information technologies, principally information networks. It was not so distant from the inception of Bauhaus, about 1940s the world met with the first computer, and then about 1970s first versions of Internet-like networks. As expected, new technologies started to influence everything, including the way we see education. As early as 1970, Seymour Papert while emphasizing the importance of experimental learning in education, argued that the use of such technologies might provide us unprecedented opportunities to further support and articulate such a pedagogy proposed "a grander vision of an educational system in which technology is used …as something the child himself will learn to manipulate, to extend, to apply to projects, thereby gaining a greater and more articulate mastery of the world, a sense of the power of applied knowledge and a self-confidently realistic image of himself as an intellectual agent." Papert was very well aware of his precedents in education, namely the works of Dewey, Montessori, and Piaget, and located his discourse accordingly. His theorizing was powerful with his references to computation and the logic of computation; however it was an age when computer technologies were still not a part of daily life and not so affordable at all. After 80s, the scene has changed primarily with *IBM* Pc's started to become widespread at homes. The change was happily acknowledged by the proponents of computer technologies, they believed that, "…until the computer, the tools and toys…" as a means of learning from exploration and experience was inadequate, but now, "The computer changed this radically. All of a sudden, learning by doing has become the standard rather than the exception" (Negroponte, 1994). The key was primarily computation and computational thinking, then the simulation and simulated environments now possible in almost any field. As a consequence, after the spread and development of digital tools "…one need to not learn about a frog by dissecting it. Instead, children can be asked to design frogs, to build an animal with froglike behavior, to modify that behavior, to simulate the muscles, to play with the frog" (Negroponte, 1994).

6. LEARNING BY DOING IN THE DIGITAL AGE: CONTEMPORARY EXPANSIONS, EXTENSIONS, AND INTERPRETATIONS IN THE FIELD OF DESIGN

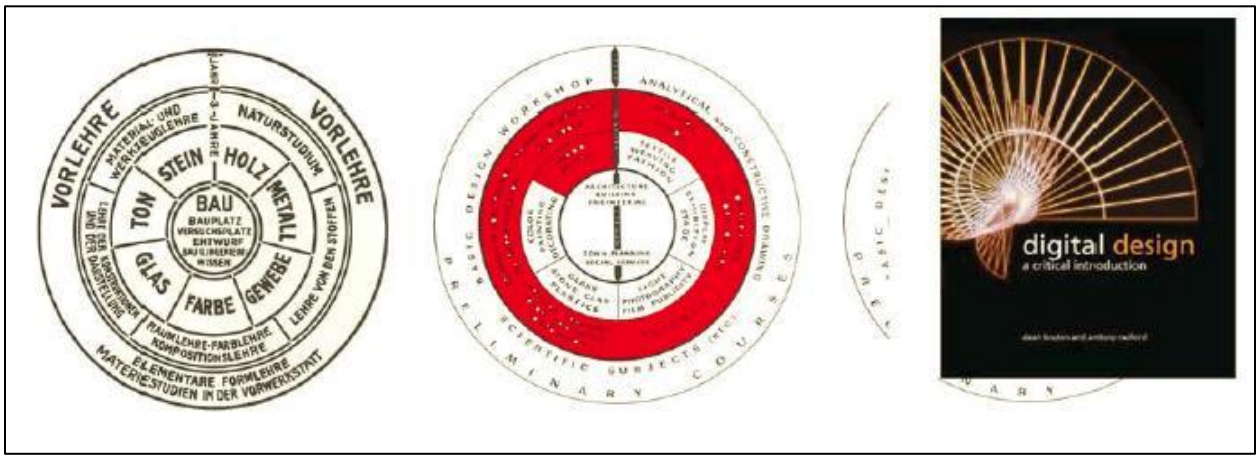

Figure 1: Bauhaus and Beyond

When viewed from a wider perspective, pedagogy under the influence of digital age has been the subject of much research. More particularly, within the context of design and design research, the influence of digital technologies upon our conventional modes of teaching, especially on studio tradition and the tradition of experiential learning were addressed from various standpoints. Although the source is abundant and have a great variety, a short introduction of these would be beneficial for the present purposes.

As it was stated at the introductory part of this study, we can distinguish two categories of approaches addressing the relationship between design pedagogy and digital technologies. The first category basically claims that within the framework of design, digital revolution must be taken as is a unique development in its own. As it was stated by Anay and Özten (2012, p. 65), "studies embracing this assumption generally have their own conceptual and theoretical framework(s), and their own standards of evaluation, almost tailored to match the nature of the new model, as they were distinguished by the 'traditional' ones, including the Bauhaus." Apparently if we are to accept such a position, we should also seek for if not unique, but a new epistemology, new body of knowledge, as well as new methods to teach architecture. Perhaps one of the most comprehensive theoretical studies in this category is Oxman's "Theory and Design in the First Digital Age."[1] Oxman (2006, p. 229) suggests that what we are facing is "unique design methodologies, unique forms of design interaction, and unique formal content" coming out of theory and praxis of so-called digital design. It is like a paradigm shift, *a-la* Kuhn, which we already began to see (or at least we should force us to see), as well theorize design in a new way, not with reference to the old paradigms those fall short in many aspects, but through the goggles of digital age. Oxman (2008) rightly identifies the challenge of the

[1] Here there is an obvious reference to Reyner Banhams's famous Theory and Design in the First Machine Age. It is not a resemblance, but in the essence, both share a similar ontological and epistemological position with their immediate past and the present.

digital for the design pedagogy as we know it, and suggests using the structure of the design concepts, created by digital design, as well as their "link to theories, models technologies, and techniques currently employed in digital design research and digital design praxis," as a medium of design education. She argues, such a framework should be "responsive to conditions in which digital concepts are integrated as a unique body of knowledge consisting of the relationship between digital architectural knowledge and digital design skill."

The second set of approaches on the other hand, seek ways to incorporate the digital technologies within the specificities of design and design teaching, or, try to transform, reform or adapt the existing pedagogies with reference to the conditions and potentialities brought about by the digital age. One of the most popular (and to that degree valuable) subcategories of this set is to use computation in teaching architecture, or vice-versa, teach architecture by foregrounding its computational aspects. For example, Stiny's "Kindergarten Grammars: Designing with Froebel's Building Gifts" (1980), represents one of the very first examples of reconsideration of a well-known previous design pedagogy namely learning by doing in the light of computation. Similarly, in one of her studies, Özkar (2005) puts forward the idea of using the logic of computation, even without computers, to teach certain aspects of design. In another study (Ozkar, 2007), she explores the possibility of learning by doing within the framework of design computation, as a means of "instruct[ing] design as a computation process," hence clashing the traditional modes of teaching and making in the studio with computing. Yet from a wider perspective, another study questions the compatibility of the digital design with the Bauhaus tradition, by comparing the essentials of the Bauhaus pedagogy with digital age. The issue is discussed upon comparatively in five main points (Unity of art and technology, ideological content, epistemology, collaborative design, and finally experiential learning), one of which is the subject of the present paper: compatibility of the experiential learning with the digital. Similarly, while locating themselves with reference to the Bauhaus tradition and "conventional" design pedagogy, Kvan, Mark, Oxman and Marten (2005) identify the digital technologies already infusing into the studio as drawing, and recording medium. They propose the computational logic to be integrated into the design instead of the superficial use of high-end software. On the one hand it would be a type of a hands-on experience where students develop their three dimensional thinking skills as well as the process through which the solution is achieved.

7. EVALUATION: A FRAMEWORK OF QUESTIONS

There is no doubt that digital age and its related technologies are influencing design and design pedagogy profoundly almost in every aspect: passively, "they have already been penetrated into the field, from many directions, imposing their own demands, and conditions, dynamics, processes, and abilities, and perhaps more important, inabilities, already changing radically the way we represent, the way we design, even the way we think [or not to be able to think]" (Anay & Özten, 2012, p. 64). Actively, we happily acknowledged and welcomed these technologies, if not because of our ceaseless (and most of the time deterministic) belief in technology as a discipline, but because they provided us a pragmatic opportunity, with all those brilliant and shiny potentialities as an answer to many of our

disciplinary pains. There is no surprise that we already have quite a stack of research and reports on the issue, of which only a few of them take a critical stand.

So, why are we still uneasy with the digital age? Why we designers failed to turn so-called digital miracle, into a miracle in design education? Why we designers (especially in older design disciplines such as architecture) are struggling this much with the digital age? Could it be our traditions, so strong that they do not accept something easily from outside; and they just resist any type of change? Or could it be the way we take digital technologies? How come introduction of digital media, no matter how powerful it affects our ways of making, doing, even thinking, changes the very essence of architecture itself, or creates something like a parallel universe, a hermetically sealed, some type of autonomous field to operate with? If we are to accept such a universe, what happens to the older? Why (and how) operational lore of architecture is categorically superseded? On what basis technology by itself could categorically replace an essentially intellectual tradition?

Or perhaps we should seek the problem somewhere else: could it be the epistemology? Yes we greatly enjoyed and experimented with all digital technologies, we taught computation to our students, we made them wrote programs that create forms, we even discussed great deal about writing computer algorithms as a work of design or art where we do not anymore deal with the final output but the precise processes and procedures that lead us to that final solution. We even changed the definition of authorship accordingly. But this was already a beaten path. After modernism didn't we already experience a similar situation? Isn't it that positivist epistemology and determinism do not go well with design, and consequently we should expect that digital technologies in their specific conception (read: positivistic or determinist) would also not go well with design? Should we jump into the latest bandwagon; once technological determinism now turned into a new one: digital determinism?

Apart from techno-utopian pictures, now we see that generally, design pedagogy, specifically problem of learning by doing in a digital age seems to be more complicated as it seems. Isolation or hermeticism is not the solution or the key. The influence of the digital age upon pedagogy could not be isolated or controlled down to one of its components or examined within a limited scope. For example, computation might be an issue, but not strong enough to provide us a paradigm shift in our teaching paradigms, only covering a part of the architectural design equation. Yet, simulation and simulated environments is another one, and representation the other. All these have its place and importance in our present day pedagogy, but they are not strong enough to provide us a paradigm shift as it was prophesied in many digital design oriented writings. We cannot build a theory of design pedagogy out of bits and pieces, within some type of intellectual vacuum.

No doubt, Papert, Negroponte and alike were right in their projections, but the influence of digital age was multi-dimensional, mostly uncontrollable and widespread which in turn bringing us a set of unprecedented problems beside the potentials. For example, we rarely acknowledge the influence of Internet and the rendering software upon design education. Don't they have great potential to work against the logic of experiential learning? With the enormous visualization potentialities, doesn't rendering software in a sense bypass the trial and error, experimenting or hands-on experience by

creating fast, convincing, shiny and seemingly all-encompassing end-image, by enabling some type of shortcut between the problem and the end product? Furthermore, do we really know, or care about what will we do with all that image bombardment in the Internet; a type of pollution, almost directly injecting itself in young people's brains, filling it with images, shortcuts, to be mindlessly imitated or copied? How do we even know whether the student's proposal is her or his product at all?

All these questions do put us into some type of dystopian position which is against the digital technologies. On the contrary, they show that as a discipline we already fell short of dealing with them and we urgently need to do something about it. First, we need a more comprehensive an all-encompassing view that will on the one hand value our great traditions of design teaching and on the other reconsider all the achievements brought about by the digital age. We must stick with the studio and experiential learning tradition. This must not be taken as nostalgia. It is about the nature of design and design teaching. At first sight, many aspects of digital age seem to be incompatible with both the studio tradition and experiential learning. But this is superficial. Operational lore of architecture cannot be categorically superseded. It contains all our wisdom accumulated throughout ages; it not only provides knowledge but also a framework to criticize and evaluate everything we have and everything we create without which we cannot operate at all. However it must be seen not as a set of unchanging facts, but a foundation to depart with, an entity that apparently needs to evolve into something else with reference to the conditions and demands of the digital age. That will be the urge we will be following. Working in bits and pieces, or isolating a certain aspect of digital design, are already helping us to explore certain aspects. We saw that computational logic, simulation and simulated environments, corporation, extensive visualization potentialities, the Internet, databases, etc. present unprecedented potential for design. But such approaches must not taken as "the model." Similarly, any hermetically sealed model if not destined to failure, is no use for design and design education. Incorporation must be the key.

There is no doubt; technological urge is one of the locomotives of change. But as we already experienced at the mid of the last century, departing from what existed before us, claiming a rupture, a techno-determinism without strong theoretical foundations and without the operational lore of the field, could lead us a dead end.

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