

ON THE ORIGIN MYTHS OF CREATIVITY, WITH SPECIAL ATTENTION TO THE USE OF DIGITAL TOOLS IN ARCHITECTURAL WORK

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ABSTRACT

Creativity is currently undergoing significant changes both in terms of actual practices (creative work) and conceptually. As for practice, this article is empirically grounded in interviews with architects who integrate virtual worlds in their work. It is argued that studies of “creative technologies” will benefit from focusing on specific, professional domains. As for conceptualisation, reflections on creativity often intertwine with reflections on humanity and technology. In philosophers Henri Bergson and Hannah Arendt, the article finds a conceptual framework for making explicit the notions of creativity, or “origin myths of creativity”, underlying some contemporary creativity literature.

1. INTRODUCTION

Creativity may change in two, interconnected ways in a time of new information and communications technologies, namely the Internet. Firstly, the actual work undertaken by those considered creative might change with technological conditions. Secondly, the concept of “creativity” might change with the discussions ongoing amongst creative professionals, policy makers, academics, and other commentators.

This article is an empirically informed, critical correlative to contemporary re-conceptualisations of “creativity”. It grew out of the project ‘Sense-Making Strategies and User-Driven Innovation in Virtual Worlds’ (funded by Danish Strategic Research Council) for which my colleagues and I interviewed architects, industrial designers and other practitioners about their innovative ways of integrating virtual worlds into their architectural practices. Although that project was guided by concepts such as *innovation* and *collaboration*, and focused on negotiations between clients, architects, engineers and other actors, the notion of *creativity* came to the fore both explicitly and implicitly in the interviews.

Interviewees tended to reflect on their craft-based identities in terms of creativity and technological change, making the interviews an appropriate source from which to contribute to this special issue of the *Journal of Communication and Society*. Broadly speaking, our interviewees embraced technological change emphatically yet insisted on their craft and creativity being fundamentally based on imagination. In a sense they perceived their core, professional creativity to be untouchable by technology. Listening closely to the stories of creativity, technology, and change told by practitioners adds nuance and

provides some empirical grounding to the ongoing discussion of creative technologies within media and communications studies.

But before using the interview material to engage critically with literature on creative technologies this article will need to take a step back. As a species we are very proud of our intelligence, our inventiveness, our creativity - and our ability to extend all that intelligence, inventiveness, and creativity through technology. Very broadly speaking, creativity and technology are some of the main attributes setting us apart from other animals. It should come as no surprise then that writings on creativity and technology are often infused with more or less explicit assumptions about human nature. I find it useful to make explicit some of these assumptions and will attempt to do so by contrasting Henri Bergson's and Hannah Arendt's thoughts on the conceptual links between humanity, creativity, and technology. With those contrasting views in place as a conceptual framework I will then use the aforementioned interviews to engage critically with selected, recent creativity literature.

2. CREATIVITY, TECHNOLOGY, HUMANITY

Taken together, Bergson's notion of *Homo faber* and Arendt's critical reaction to that notion provide a basic yet productive conceptual framework for considering the links between creativity, technology and humanity. This should not be taken as an attempt at reviewing the vast philosophical literature dealing with these issues. Bergson and Arendt have been chosen because their clarity of thought, and the sharpness of their intellectual antagonism, makes them useful for marking out positions in a vast field of ideas. And as I hope it will become clear in the following, their thoughts provide a useful backdrop for critically reviewing more recent writings on creativity.

Bergson formulates the idea of *Homo faber* in his 1907 "Creative Evolution" (English translation 1911), and from that book *Homo faber* spread into 20th century philosophical discourse (Arendt, 1958:136, n. 1). As a noun *faber* means worker and artisan, as an adjective *faber* means workmanlike, skilful, ingenious (Lewis & Short, 1879), hence *Homo faber* literally means 'ingenious man' or 'man the worker' in Latin. *Homo faber* is the formatting (Xxx yyy) used in biology when denoting a species with a Latin binominal, e.g., *Homo sapiens*. Merriam-Webster translates *Homo faber* as "man the maker or creator". (For an overview of other philosophers interested in "Human Beings as 'Makers' or 'Tool-Users'", see Scharff & Dusek, 2003:339-382.)

In "Creative Evolution" Bergson is concerned not merely with human nature but with nature and life as such. In a critical response to "the Darwinian theory of insensible variations" driving the evolution of life forms (Bergson, 2001:61), Bergson proposes the *élan vital* (the "vital impulse" in the original, English translation). *Élan vital* is described vaguely as "a tendency to act on inert matter" (2001:93). In the animal kingdom *élan vital* evolves along two paths, those of intelligence and instinct, and Bergson finds intelligence most fully developed in humans. In the grand scheme of Bergsonian

philosophy we are, as a species, the pinnacle of a specific strand of *élan vital*, namely the drive towards intelligent action.

Bergson describes the difference between instinct and intelligence through their differing approaches to tools (here it should be remembered that also non-human animals use and to some degree even manufacture tools). Instinctive use and manufacture of tools is efficiently organised, predictable, and aimed at reducing choice, or “closing”. Intelligent manufacture and use of tools, on the other hand, is unorganised, “it lays open to activity an unlimited field into which [the animal] is driven further and further, and made more and more free” (2001:137). Here it would probably be acceptable to most present-day readers if “intelligent tool use” was replaced with “creative tool use”. Bergson does not use “intelligence” in the sense of “pure intellect” but associates intelligence with free action in the material world, aided by tools and constantly widening its field of possibilities. That seems to me a rather apt, preliminary summary of the connotations the word *creativity* has today.

To highlight that “*intelligence, considered in what seems to be its original feature, is the faculty of manufacturing artificial objects, especially tools to make tools, and of indefinitely varying the manufacture*” (2001:135, emphasis in the original), Bergson suggests that our species ought to be renamed *Homo faber*. With Bergson we have the conveniently clear position that *creativity is technology*. When *élan vital* meets matter in an intelligent way - creatively opening up possibilities rather than closing options down - technology (“artificial objects, especially tools to make tools” in the original) *happens* (Bergson stresses the procedural nature of technology, how it goes on “indefinitely”). And humanity is the clearest known embodiment of intelligent *élan vital*.

Hannah Arendt is very critical of Bergson in her 1958 “The Human Condition”. To begin with, she rejects all “attempts to define human nature” since such attempts “almost invariably end with some construction of a deity, who [reveals himself] to be a kind of Platonic idea of man” (Arendt, 1958:11). She does find it possible, however, to make general statements about the ways in which human life is conditioned, hence the title of her book.

Arendt spends much of “The Human Condition” deconstructing Bergson’s *Homo faber*. Rather than the ultimate expression of *élan vital*’s intelligent strand, *Homo faber*’s drive towards invention and production is revealed to be an expression of a particular, modern subjectivity infused with utilitarian ideas and perfected for the capitalist system of not only production but also consumption. *Homo faber* sees itself as “the measure of all things” (Arendt, 1958:155). Nothing has inherent value for it, it regards everything in the world as a means to an end. This is not human nature (which we can never truly know) but life under certain conditions, namely, those of work (as distinct from the life conditions of *labour* and *action*):

Work is the activity which corresponds to the unnaturalness of human existence, which is not embedded in, and whose mortality is not compensated by, the species’ ever-recurring life cycle. Work provides an “artificial” world of things, distinctly different from all natural surroundings. (1958:7)

By creating a “world of things” that can last even after we are gone we stabilise our lives (1958:137), and it is worth mentioning for the present purposes that Arendt pays special attention to art works. Since art works are characterised by their permanence they are emblematic of the existentially stabilising role of things in human life; hence art works are “the most intensely worldly of all tangible things” (1958:167). As we shall see later, this resonates with contemporary thought on the connection between creativity and (hand-) craft.

Like Bergson, Arendt highlights *Homo faber*'s use of tools, or instruments, but only to deepen her criticism of *Homo faber*'s utilitarian outlook on the world: “Man, in so far as he is *homo faber*, instrumentalizes, and his instrumentalization implies a degradation of all things into means, their loss of intrinsic and independent value” (1958:156). The formulation gives a sense of how critical and also political Arendt's text is. Her deconstruction of humanity's seemingly natural *Homo faber* condition is ultimately aimed at the re-politicisation of human life. Arendt follows Marx in taking the view that if humanity is *Homo faber*, or the “tool-making animal” as Benjamin Franklin puts it (Parton, 1864:6), humanity cannot be the “political animal” it ought to be (Arendt, 1958:159). To be political is to act, and action, “as distinguished from fabrication, is never possible in isolation” (1958:188). That isolation is necessary for production is most clearly seen in the division of labour as described by Adam Smith (2001) in his 1776 “The Wealth of Nations”, but Arendt also mentions “mastership” in craft: “This isolation from others is the necessary life condition for every mastership which consists in being alone with the ‘idea’, the mental image of the thing to be” (1958:161).

With Bergson and Arendt, then, we have two clearly opposed poles in reflections on human creativity understood broadly as our species' ability to create. Both thinkers emphasise intense engagement with the material world, and they both emphasise the close connection between creativity and the making and use of tools, but where Bergson sees the highest expression of human nature, summarised in his call for our species to be renamed *Homo faber*, Arendt sees historical conditions for human life which entail isolation and a deplorable decrease in the potential for political thought and action.

3. VIRTUAL WORLDS AND ARCHITECTS

At this point I would like to introduce our interview material and make a few remarks as to how it resonates with the ideas of Arendt. It will become clear that the idea of isolation as a precondition for creative work is an important one, not only in philosophy but also in the thoughts of practitioners.

In May and June 2010, we conducted nine interviews with creative professionals involved in the innovative implementation of virtual worlds into architectural practices (see table 1 below for overview). Virtual worlds should be understood as large-scale, on-line, 3D spaces traversed with the aid of an avatar: a graphical representation of the user functioning as a focus for the user's sense of agency in the virtual world.

Abbreviation	Definition	Date Interviewed
ARCH1	Architect	April 2010
ARCH2	Architect	April 2010
ARCH3	Architect	April 2010
ARCH4	Architect	May 2010
ARCH5	Architect	May 2010
ARCH6	Architect	May 2010
DES1	Industrial Designer	May 2010
DES2	Industrial Designer	May 2010
ENT1	Entrepreneur, Mathematician	May 2010

Table 1: Index of interviews. After Liboriussen & Plesner 2011:82

Our focus was on the negotiations between the actors involved in architectural design - architects, engineers, clients, users, etc. - and how the negotiations between these actors could change with technology: “3D online world technologies seem to offer a shortcut for communicating about spatial matters and creating spaces for participation in relation to decision-making on design” (Liboriussen & Plesner 2011:82). To some interviewees this was primarily a matter of opening up a new chapter in the sometimes contested, always complex relationships between architects/designers and engineers [ARCH3, ARCH6] and clients [ARCH1, ARCH4, ARCH5], others expressed idealist notions of increased citizen engagement in urban planning through virtual worlds [ARCH2, DES1] or community building of various sorts [ARCH5, DES2].

Across the interviews, reflections on virtual worlds and technological change were intertwined with reflections on what it means to be an architect. That identity was constructed by contrasting the spatial imagination of the architect with the lack of this particular kind of imagination found amongst “laymen” [ARCH3 20:08] such as engineers and clients [cf. ARCH4 and ARCH6]. Our architect respondents took pride in their ability to imagine space from two-dimensional props. Although they certainly feel very capable around new information and communications technologies, the fundamental skills of the architect are psychological and not tied to any specific instance of tools: “It is [like] a professional language [describing space]. Your brain has been educated to decode 2D objects [sketches] as 3D” [ARCH3, 3:50].

Although our architect respondents held that the effects of switching from pen and paper to digital 3D-modelling were of no actual consequence when the core of the architect’s professional identity was considered, the indirect effects were significant. Our interviewees acknowledged the practical and economic advances that 3D-modelling represent. When all actors - engineers, architects, sub-contractors - can refer to the same 3D-model, the number of errors in the building process is reduced significantly. Engineers and architects take out parts of the (same) model, work on the parts, and re-insert them into the model. Subcontractors get the information they need directly from the model, reducing the risk of costly misunderstandings between subcontractors and other actors [ARCH3 30:45].

But this efficiency comes at a cost in terms of a shortening of the early phases of individual, creative work in a building project. Here it should be remembered that all major building projects involve a team of architects, from five or ten up to as many as thirty on large-scale projects. Before the introduction of 3D-modelling, individual architects could nurse their own ideas before presenting them to others. They could, at least for a time, “[be] alone with the ‘idea’, the mental image of the thing to be”, as Arendt put it above when describing isolation as a precondition for mastership.

In contemporary literature on creativity, the isolated phase in which the creative professional nurses the idea is referred to as the “preparation” and “incubation” phases, for example by Mihály Csíkszentmihályi who describes preparation as “becoming immersed” in the task or material at hand and incubation as a phase in which “ideas churn around the threshold of consciousness” (Csíkszentmihályi, 1996: 78). Although there is a growing literature on creative teamwork, that literature positions it as a minority voice: “The lack of attention to group factors in the creativity field is consistent with much evidence in the literature that groups may inhibit intellectual activity or optimal performance” (Paulus & Nijstad, 2003: 4). The majority view on the early, idea-generating phases of creative work seems to be that those phases are best carried out by individuals in isolation, a theme I will trace through selected creativity literature before returning to my architect interviewees.

4. ISOLATION, ART, AND ORIGIN MYTHS OF CREATIVITY

The clearest articulation of the idea that isolation is a precondition for creative work is arguably found in the Romantic figure of *the genius*. The genius is an artist, and it is well known that the concept of *art* is a peculiar Western invention and only about two hundred years old. Ellen Dissanayake:

The word art as used before the late eighteenth century meant what we would today call ‘craft’ or ‘skill’ or ‘well-madness,’ and could characterize any object made or performed by human [...] agency” (Dissanayake, 1995:40). Emphasis in the original)

An efficient rhetorical strategy in recent creativity literature is to highlight how creativity has been associated with art and aesthetics since the late eighteenth century invention of these two, closely related concepts, and to then offer a return to a pre-Kantian, perhaps more craft-oriented notion of creativity. Thus Philip McIntyre opens his recent book with the sentence “Creativity is not what most people think it is” (McIntyre, 2012:3), denounces the Romantic “genius model” of creativity for being “completely agent centered” (2012:69) and offers to reconceptualise creativity in a way that makes room for both creative individual and social context. (McIntyre’s review of the various approaches to studying creativity is in fact much more wide-ranging and carefully thorough than it might appear here. David Gauntlett, whose latest book I will deal with later, employs a similar, anti-Romantic, rhetorical strategy.)

In a sense the Romantic image of the genius - Beethoven sitting in solitude by a brook composing masterpieces - is offered up as a negative origin myth: Creative work can certainly not be reduced to *this*. But what would be a positive construction of the concept of creativity, a positive origin myth? And if such a myth entails isolation, is it necessarily a Romantic isolation, the solitude of genius? By “myth” I mean the more or less explicit foundational scenes, stories, and images that give a creative profession some sense of identity, not the product of superstition and religion.

If we look for origin myths in the arguably most influential 20th century architect, Le Corbusier, he speculates on “man’s” [sic.] first attempts at building as follows: “all around him the forest is in disorder; its vines, bushes and tree trunks obstruct him and forestalls his efforts” (Le Corbusier, 2008:134)). In reaction to natural disorder, the human being must “build well and distribute his labor, to guarantee the solidity and utility of the work [by taking] measurements [, by introducing] order” (2008:133).

Le Corbusier’s early builder is a true *Homo faber* according to both Bergson’s and Arendt’s definitions. *Homo faber*’s Bergsonian intelligence is practically directed towards the material world but as Le Corbusier stresses repeatedly, true architecture has to “go beyond” the purely utilitarian if it wants to be more than mere engineering (2008:195). Here we can contrast on the one hand Le Corbusier’s architecture and Bergson’s intelligent tool use with its opening up of possibilities and, on the other hand, engineering, instinctive tool use and “closing”.

As for Arendt’s version of *Homo faber*, Le Corbusier warns against taking early orderings of nature to be the actions of “primitive man”: “There is no primitive man; there are primitive means. The idea [of ordering, BL] is a constant potential from the start” (2008:133), matching Arendt’s insistence on having philosophical access to the human condition but not to human nature. However, Le Corbusier naively takes the utilitarian attitude of measuring and ordering to be “potential from the start”, as if it was human nature to eventually reach that attitude. In his own building practice, Le Corbusier certainly has the *Homo faber* attitude of taking himself as “the measure of all things”. This sentiment is expressed most explicitly in his *Modulor* (see Le Corbusier, 2000b and Le Corbusier, 2000a). The *Modulor* is a design method aimed at applying the golden ratio whilst observing the human body as the alpha and omega of design. Concretely, the human body has “the height of the tallest man (six feet)” (Corbusier, 2000:123) to ensure that no users find the final design too small. The ordering “measurements” of raw nature are done according to the scale of the human body, not according to some inherent structure found in the world itself.

Isolation is built into Le Corbusier’s origin myth of architecture: The heroic, mythical, proto-modernist builder stands in the untamed wilderness and projects out into nature an imagined body. Not a “social body” - a tribe or a family - but the imagined body of a human individual in isolation.

Mihály Csíkszentmihályi is, in David Gauntlett’s words, “perhaps the best-known of today’s creativity researchers” (Gauntlett, 2011:13) and in his influential book, “Creativity: Flow and the Psychology of Discovery and Invention”, he conjures up a mythical origin scene very close to Le Corbusier’s. But first a brief introduction to Csíkszentmihályi’s theory of creativity:

Csikszentmihályi's "preference would be to approach creativity as a subjective phenomena" (Csikszentmihályi, 1996:403). We could, of course, ascribe this preference for studying individuals to cultural influences, for example the Romantic genius myth, but it seems much more straightforward to simply acknowledge that Csikszentmihályi as a psychologist focuses on the inner workings of individual, human minds. However, Csikszentmihályi sees "no realistic way" of studying creativity in his preferred way (1996:403). For something to be termed creative it has to be regarded as novel, and although he has enormous respect for the creative work taking place in the minds of creative people, Csikszentmihályi cannot let them decide for themselves whether or not their creations are novel. That decision has to be done within the symbolic *domain* in which the creative person works, for example the domain of music or physics, where a "field of experts [...] recognize and validate the innovation" (1996:6, my emphasis). Only then can the novel offering be labelled creative. Thus Csikszentmihályi's "systemic perspective on creativity" actually "relocates the creative process outside the individual mind" (1996:403), and creativity can be described as "a process by which a symbolic domain in the culture is changed" (1996:8).

In light of the above it could be assumed that Csikszentmihályi's research would be empirically focused on fields and domains but true to his initial impulse, Csikszentmihályi's research relies on interviews with highly creative individuals, that is, people who have changed their domains (several of Csikszentmihályi's interviewees have been awarded Nobel Prizes). At times, Csikszentmihályi's description of those "extraordinary" individuals (1996:11) verges on hero-worship: "To achieve the kind of world we consider human, some people had to dare to break the thrall of tradition. [...] What we call culture [...] is their creation" (1996:317). This surely resonates with Arendt's thoughts on *Homo faber's* world constituted by things of its own creation.

Another parallel to Arendt can be found when Csikszentmihályi highlights the isolated and isolating nature of domains: "each domain describes an isolated little world in which a person can think and act with clarity and concentration" (1996:37). The psychological function of the domain is to isolate the creative individual from the rest of society in order to facilitate the creative process. Again we find Arendt's master creator "being alone with the 'idea', the mental image of the thing to be". Csikszentmihályi even divides domains into subdomains - mathematics is, for example, subdivided into algebra, number theory, topology etc. (1996:9).

Finally, this brings me to the origin myth of creativity which can be found in Csikszentmihályi. His 1996 book is divided into three parts. The first covers his systems approach to creativity, the second deals with creativity in various life phases, and the third is devoted to exploring selected domains of creativity. I find it important that the first domain under discussion is "The domain of the word" (chapter ten, 1996:237-64), that is, creative writing. The chapter opens by inviting the reader to imagine a group of early humans sitting around a campfire: "The rhyme and meter of poetry created patterns of order that must have seen miraculous to people who had yet scarcely learned to improve on the precarious order of nature" (1996:238). Here we find a close relative of Le

Corbusier's early builder. One uses the human body, the other the human mind, both of them are strong individuals projecting order and rhythm into the wilderness.

As Csíkszentmihályi's campfire audience listens to the "first narrative stories telling of real or imaginary events", "the range of human experience [is extended dramatically] through imagination" (1996:238). Csíkszentmihályi could have invited his reader to imagine a primordial visual artist picking up a soot-covered stick to draw the first cave painting (thus extending the range of human experience dramatically). But we are invited to imagine the first story-teller. That choice gives a certain primacy to language, fitting the psychologist's focus on minds and ideas. It is a choice that highlights the internal work of the individual and downplays the role of external tools, and by extension technology, in the creative process.

5. EXTERNALISATION AND DIGITAL MORPHOGENESIS

To a certain extent, the choice between internal, creative processes and external technology is a false choice. When creative individuals externalise their ideas it is not only done in order to communicate; to share his or her ideas with others, maybe to invite them into the creative process. Externalisation is also part of the individual, creative process (see also Gänshirt, 2007:60), as mentioned somewhat halfheartedly by Csíkszentmihályi in connection with at least two of the five phases he divides the creative process into: immersion, incubation, insight, evaluation, and elaboration (1996:79f). Csíkszentmihályi arguably finds externalisation most relevant in the evaluation phase, when

The painter steps back from the canvas to see whether the composition works, the poet rereads the verse with a more critical eye, the scientist sits down to do the calculations or run the experiment. (1996: 104)

Here we have creative individuals rather late in the creative process, alone with the tentative embodiments of their imagined ideas now laid open to visual sensation, for example the canvas (medium for the imagined composition) and the written poem (medium for the imagined verse). There appears, incidentally, to be a certain mentalist slant in Csíkszentmihályi's aesthetic sensibilities. He seems to hold the idea, the originally imagined (the composition, the verse), not its physical embodiment (the canvas, the poem written down), to be the actual work of art. Such an assumption might lead, if not in the work of Csíkszentmihályi himself, to creativity research focusing overly on the early phase of idea generation. There is certainly a large and growing literature dealing with brainstorming and other techniques for generating ideas but in the words of Eric F. Rietzschel et al.: "idea generation is only a part of the creative process and (usually) not a goal in itself" (Rietzschel, De Dreu, & Nijstad, 2009:4).

Csíkszentmihályi also, but to a lesser extent, allows externalisation into the first phase of creative work, immersion, when he observes in a footnote that

It is not only writers who keep diaries and notebooks for daily experiences. Scientists also keep lab notes or other records that will help them think through their findings and ideas. (1996:414)

Again, it seems important to me that writers come first, in a sense providing a model for creative work in other domains. Not that my own research bears any comparison to Csískzentmihályi's in terms of scope and depth, but it is worth comparing the two in order to examine how the notion of creativity is constructed differently in various domains. A focus on writers (of novels, poems etc.) externalising their ideas by keeping diaries yields different results than a focus on architects who must deal with much more complex projects and rely on much more elaborate externalisation of ideas.

As one architect respondent put it, the complexity of architectural projects necessitates drawing quite early on in the creative process, hence a “feedback loop” is established between the “drawing” and the individual architect's “brain” [ARCH3, 2:05]. As already mentioned, respondents hold on to the idea that architectural practice relies fundamentally on spatial imagination rather than a set of specific, physical tools, and that trained architects can imagine proposed solutions with the aid of fairly primitive props. Where the architect only needs a simple, two-dimensional sketch to imagine the finished building, the layman needs a three-dimensional model. The 3D-model might be useful for the architect but he or she does, in principle, not need it: the “fundamental skills of being an architect are basically the same, although you have been given new tools to get from A to B” [ARCH3 24:17]. If there is a general, mythical origin image for architectural, creative work it is the architect equipped with pen and paper to aid his or her highly trained, spatial imagination.

Some architects and architectural theorists argue, however, that the use of computers in architectural work does indeed signal a significant change to the profession itself. Neil Leach:

the computer [cannot simply be regarded] as a sophisticated drafting tool – an extension [...] of the possibilities of the previous paradigm of ink on tracing paper – but also as a device that might become part of the design process itself. With this we see a development in the very nature of the architect from the demiurgic ‘form-giver’ to the architect as the controller of generative processes (Leach, 2009:35)

In other words: When the creative feedback loop between internal ideas and external representations is between a mind and a computer, rather than a mind and a pen, the tool gives access to unimagined possibilities. It becomes the task of the architect to make choices in order to “control” the “generative processes” of the computer. Hence Leach goes on to stress that the architect's imagination is still quite important but “has been displaced into a different arena – into the imaginative use of various processes” (2009:35). Branko Kolarevich has suggested *digital morphogenesis* as a label for this new paradigm in architecture, signifying that the actual building is to be thought of as a reflection of ongoing, form-generating processes upheld by computers (Kolarevic, 2003). (The degree to which architects embrace the ways of working just sketched might be a question of age: One of our respondents mentioned how “younger” colleagues explored the form-suggesting possibilities of computers [ARCH3: 44:18].)

With digital morphogenesis in architecture we encounter a paradigm for creativity centred on technology. It is not a paradigm celebrated by all architects, far from it, but it seems a reasonable, theoretical response to specific, new ways of doing creative work practised by some architects. Digital morphogenesis stands in stark contrast to approaches such as Csíkszentmihályi's that take idea generation and other mental processes as their starting point, but that contrast in approaches merely proves that although there are similarities between creative practices across domains there are also differences - and significantly so when it comes to the relative importance of technology. Incidentally, Leach's position signals a radical departure from earlier writings where he inscribed the computer in a professional culture of "parallel motions, set squares, tracing papers, and, ultimately, computers" (Leach, 1999:10). This reversion of position is a sign of intellectual vigour: As technology changes, so does creative practices (and vice versa), and so should theory.

As for a new origin myth of architecture fitting digital morphogenesis, Leach already suggested that theme in the above with "a development in *the very nature of the architect* from the demiurgic 'form-giver' to the architect as the controller of generative processes" (my emphasis). "Demiurgic form-giver" fits Le Corbusier's architect well, but the architect who embraces digital morphogenesis is not a hero who wills structure onto nature by projecting humanity's proportions out into the wilderness. He or she does exactly the opposite: draws inspiration from nature. Leach pinpoints the source of inspiration to the research field of biomimetics - "the study of what we can learn by replicating the mechanisms of nature" - (Leach 2009: 35), others talk about "nature" and "life" more broadly; Greg Lynn, who was one of the first architects to explore the new, digital possibilities, says he employs "systems that can simulate the appearance of life" (Lynn quoted in Lenoir & Alt, 2003:328), and is in turn criticised by Kenneth Frampton for justifying his "arbitrary selection of a particular shape [...] solely on the grounds that at a given instant it may be found somewhere in nature" (Frampton, 2007:359).

Many of the architects who practice the ideas pulled together under the umbrella term digital morphogenesis would disagree with Frampton. Natural shapes are not selected "solely on the grounds" that they are natural. Here is Salvador Pérez Arroyo's poetic call for natural inspiration:

the natural universe is based upon flexibility and mutations. The bird's wings, the branches of trees, the natural elements of water and strong winds. We are surrounded by mobility and transformations. Structure and architects will follow this reality. (Gausa et al., 2003:575)

It is the "flexibility and mutations" of evolution that makes nature a source of inspiration. Fitting an age of economic and ecological crisis, it is nature's "logic of optimisation" that fascinates Leach (2009:35), "nature's optimal efficiency" that makes Eugene Tsui a proponent of "evolutionary architecture" (Tsui, 1999:2). According to the paradigm of digital morphogenesis, today's architects should be inspired more by the efficient ways in which "lower", natural life forms adapt than by the heroic postures of

“high” modernism, more by what we have in common with the rest of nature than what sets us apart from it. To sum up with Bergson, digital morphogenesis is a call for the merging of intelligence and instinct (that is, instinct for flexibility, adaptation, and efficiency). Instead of the architect who aids spatial imagination with pen and paper, we find a new kind of architect who imaginatively and intelligently manages digital simulations of instinctual, natural processes suggestive of resource-efficient, built form. A firm but gentle shepherd rather than a conquering hero.

6. CRAFT, ART, AND CONNECTIVITY

David Gauntlett has recently written a wide-ranging and passionate book about creativity under the current technological conditions of the Internet and the World Wide Web (Gauntlett, 2011). A look at Gauntlett’s book is a fitting way to sum up the issues addressed in the above and move towards a conclusion.

Gauntlett’s book deals with everyday creativity, that is, “making and sharing your own things” rather than buying mass-produced things (2011:162). In terms of concepts, the aim is to disconnect everyday creativity from *art* and ground it instead in *craft*. Gauntlett is passionately motivated for this project. He seems to agree with Arendt’s critical observation that isolation is a precondition for mastership. He also seems to agree with Csíkszentmihályi’s description of creative domains in terms of isolation - but only if these domains are part of the “artworld” in contrast with the “craftworld” (2011:66). In “art and design, “distinctive individual voices may be more engaging than a combined swamp of ideas” (2001:201) whereas in the craftworld, social connections nourish creativity rather than hinder it. Thus craftworld or everyday creativity is assigned the very important function of countering isolation and, by extension, keeping society from “falling apart”:

when [people] remain isolated, strangers to their neighbours, not communicating - then society enters a downward spiral. That doesn’t just mean ‘a bit less friendly’, but really falling apart, with higher levels of crime, distrust, depression, and illness. (2011:131. Emphasis in the original)

Gauntlett finds intellectual strength to reorient creativity towards craft in his “philosophical heroes, John Ruskin and William Morris” (2011:217). Throughout the book, Gauntlett lets contemporary expressions of everyday creativity resonate with the ideas of Ruskin and Morris. “We find”, for example, “ourselves to be modern versions of John Ruskin” when we make YouTube videos, and “William Morris would have approved of” the ideals underpinning the notion of “Web 2.0” (2011:85 and 40).

The above quote - “when [people] remain isolated” etc. - is in a sense a negative origin myth of everyday creativity: a dark vision of what happens if everyday creativity does *not* play a role in people’s lives. Gauntlett’s book is also underpinned by a positive origin myth of everyday creativity, an image encapsulating what everyday creativity ought to be. He finds that positive myth in one of his philosopher-heroes, Morris, who lived in the 19th century but pointed to the middle ages as an age of true “fellowship”, a term

updated to “community” by Gauntlett (2011:34). One of the medieval ways of achieving fellowship was through the sharing of artfully made objects and Gauntlett offers a lengthy Morris quote to explain why this is so:

But a man at work, making something that he feels will exist because he is working at it and wills it, is exercising the energies of his mind and soul as well as his body. Memory and imagination helps him as he works. Not only his own thoughts, but the thoughts of the men of past ages guide his hands; and as a part of the human race, he creates. (Morris quoted in Gauntlett 2011:41)

The human being conjured up by Morris is clearly related to *Homo faber*. It is related to Arendt’s *Homo faber* through the life conditions of work (“man at work”), but also to Bergson’s *Homo faber*. The creative “energies” flowing through “mind and soul as well as [body]” could be translated as *élan vital*, working and “willing” matter. But this is not done in isolation. When Morris’, and Gauntlett’s, *Homo faber* creates, he or she becomes a social and historical being - and this is good. The main thrust of Gauntlett’s book is that everyday creativity is essentially positive. It nurtures engagement in every positive sense of the word - emotionally, socially, politically - including an almost existentialist sense reminiscent of *élan vital*’s directness towards the material world: “making is connecting because through making things and sharing them in the world, we increase our engagement with our social and physical environments” (2011:2).

Having thus reoriented creativity Gauntlett can suggest a deep affinity between everyday creativity, the social, and the digital. The radical spread of digital technology into the daily lives of virtually everyone living in the developed world means not only the spread of tools for creation (for example cheap video cameras and editing software) but also the spread of tools for sharing (for example the sharing of homemade videos on YouTube). Some of the tools for creating and sharing might even be contained by the same piece of technology, for example the smartphone or the laptop. As Gauntlett explores in great detail, making and connecting really do blend together in the practice of contemporary everyday creativity. However, Gauntlett’s reorientation of creativity relies on two, conceptual distinctions which I find somewhat problematic in light of my own, modest, empirical material. Firstly, a distinction between art and craft. Secondly, a distinction between professional and non-professional. Gauntlett uses the two distinctions almost interchangeably (the artworld is a world of professionals, the craftworld is a world of non-professionals), thus art plays the role as a conceptual counter-image to creativity: the isolated and isolating artworld vs. the socialising craftworld. Gauntlett has empirical grounding in place for this conceptual move, namely conversations with craftspeople in which “art” does indeed refer to professional practices, sometimes upheld with the aid of institutions. Gauntlett’s craftspeople happily identify their communities against the artworld and their creations against art. But generalising from this particular, observed craftworld to the concepts of creativity, art, and craft more broadly generates problems if we try to use the concepts outside of their native domain, for example in the domain of architecture, as exemplified by the interviewees I have had access to.

Our architect interviewees are trained professionals, they make their living based on their training, and their strong sense of professional identity is based on the opposition between professionals and laymen (in Liboriussen & Plesner 2011 we deal with the issue of the architect's professional identity in some detail). At no point do our interviewees come close to describing themselves as "artists" or their practices as "art". One interviewee actually refers to himself as a "craftsman" [ARCH6: 4:20]. It could be argued that the architect's appreciation of isolation in the early phase of the creative process is typical of artworld practice. On the other hand, the negotiations between architects, engineers, clients and subcontractors plays such a major role in the subsequent phases of an architectural project that architecture can hardly be said to be done in isolation.

The role of the architect then, shows that the distinction between art and craft is not necessarily useful for distinguishing between individuals who are artists (and follow artworld practices) and individuals who follow communal, craftworld practices. Surely, a professional can be a craftsman even if he or she follows some of the practices understood as artistic in some of the phases of a project. Looking at this from the perspective of the non-professional, the clear distinction between professional/artist and non-professional/craftsman makes it problematic to label something produced by a non-professional "art", clearly not a useful limitation on the use of the word "art". In the concluding section I will suggest a terminology I find less problematic.

7. SUMMARY: *HOMO FABER* AND ORIGIN MYTHS OF CREATIVITY

Moving towards a conclusion, I would like to take stock of the origin myths of creativity I have presented, starting with the notion of *Homo faber*, the creative, human being. Arendt brings an additional dimension to *Homo faber* when she stresses that isolation from other humans is a precondition for *Homo faber's* creativity. Csíkszentmihályi shares this idea and takes it one step further when he shows how isolation is a precondition for creative work but also on the levels of domain and subdomain.

Csíkszentmihályi's origin myth of creativity is the primordial, human being willing structure onto reality through the stylistic dimension of language (primarily rhythm). Since that which is created is oral, the distance from thought to creation is very short. It comes as no surprise then that externalisation, and by extension technology, plays a relatively small role in Csíkszentmihályi's theory.

Le Corbusier very similarly to Csíkszentmihályi offers the origin image of an early human being willing the untamed wilderness into built environment. Le Corbusier's *Homo faber* stands tall and alone, and uses his (it is de facto "his") individual body as guiding measurements for creation. *Homo faber* does indeed find himself to be the measure of all things. Incidentally, the notion of the creative person as an isolated person should probably not only be traced to the Romantic genius (as it is in some current literature) but also to the individualistic hero of high Modernism.

Gauntlett finds an origin myth of creativity in Morris's variant of *Homo faber*, a human being who finds fulfilment in creation because it makes him or her aware of historical and social contexts.

Amongst the architect interviewees, the dominant origin image is that of the architect who in contrast to mere laymen, and relying on specially trained, spatial imagination, is able to imagine finalised structures with minimal tools epitomised by pen and paper. Importantly, this is not an origin image of creativity in general but of a specifically architectural creativity.

All the origin myths of creativity mentioned in the above are implicit in their various sources. When it comes to more explicit re-conceptualisation of creativity in light of digital technology, the architectural paradigm of digital morphogenesis offers a very robust example. Here the origin image of creativity - or rather: architectural creativity - is that of architecture as the process of finding forms amongst digitally simulated, natural process. The architect as an intelligent finder of instinctually suggested forms rather than as someone who wills structure into existence. This vision of architecture allows the architect to remain *Homo faber*, creating intelligently rather than instinctively, whilst reorienting the profession of architecture towards nature and technology simultaneously. A lofty vision yet grounded in the concrete practices of many architects working today.

8. CONCLUDING SUGGESTIONS

As conclusion, I would like to offer two suggestions for the study of creative technologies:

- a) Critically examine the origin myths of creativity implicit in creativity literature
- b) Focus on distinct professions (domains) or on amateurs

(A) CRITICALLY EXAMINE THE ORIGIN MYTHS OF CREATIVITY IMPLICIT IN CREATIVITY LITERATURE

The concept of creativity invites us to reflect on the relationship between humanity and technology. Humanity, because our being creative is one of the most obvious ways we stand out from other animals. Technology, because human creativity is involved in creations so complex that externalisation is required.

Externalisation in creative projects is done with tools. If we called such tools “creative tools” simply because they are involved in creative projects, we would not be allowed to distinguish between the pencil used to draw the Sydney Opera House and a pencil used to write a grocery list. Instead, we can talk of creative tool use when “creative” is used synonymously with “intelligent” in Bergson’s sense, that is, aimed at a constant widening of possibilities rather than instinctual closing.

The conceptual relationship between humanity, creativity, and technology is so richly complex that it might destabilise the meaning of “creativity” beyond usefulness. A way of guarding against this tendency is to critically examine what I have called origin myths of creativity: the (mostly implicit) foundational scenes, images, or stories relating to creativity that underpin both scientific explorations of creativity and the identities of both professional or non-professional groups that engage in creative practices in a significant way. This article has explicated origin myths of creativity in Bergson, Arendt, Le Corbusier, Csíkszentmihályi, and Gauntlett (who found Morris’ origin myth appealing), using the figure of *Homo faber* as a means to draw connections between myths.

(B) FOCUS ON DISTINCT PROFESSIONS (DOMAINS) OR AMATEURS

Within architectural discourse, the concept of digital morphogenesis has emerged as an umbrella term to guide current rethinking of the relationship between creativity and technology. The concept is theoretically sophisticated yet grounded in actual, creative work, and it manages this balancing act because it is limited in scope. It offers an origin myth for architectural creativity, not creativity per se. I believe that this shows the way forward, if we want to develop the idea of “creative technologies”. Psychologically, “creativity” is understood to underlie the full range of creative practices from artistic creation to scientific discovery, but creative technologies do not underpin practices, they *are* practices. *Creative technologies are the sets of techniques, practices, and modes of thought involved in the externalisation of ideas within specific domains where externalisation takes place intelligently (in Bergson’s terminology), or: creatively.*

As observed earlier (see section six), broader notions of creativity do not always travel well from domain to domain. Sharp distinctions professional artist and craftsperson, and between artworld and craftworld, generated problems for the concept of art. “Art” is a notoriously ambiguous concept but it remains relevant, it might even be necessary, for discussions of creative practices. Art thus came up casually both in the architect interviewees I have referred to here and it comes up in the conversations with the animators and designers I am currently interviewing. “Art” is not referred to as an institution one finds professional identity in but as the results of previous creative work standing ready as a source of inspiration. Surely art is also a source of inspiration for non-professional creatives, despite Gauntlett’s observations regarding the antagonism between craftworld and artworld.

Perhaps a better distinction (than art/craft, artworld/craftworld) would be between *professional* and *amateur*. Of course amateurism has certain negative connotations, but the amateur - from French, from Italian *amatore*, from Latin *amator* ‘lover,’ from *amare* ‘to love.’ (the OED) - is after all a lover of his or her domain, with all the warm connotations Gauntlett aims for with “craft”. We could then simply contrast amateur with professional instead of craftsperson with artist, and let art remain a source of inspiration for both. //

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