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The Renaissance Roots of the Digital Turn

Abstract

In the following article I trace affinities between Renaissance ideas and the digital turn in contemporary humanities. There is a need to define this turn by referring to important historical achievements of *quadro* and *cinquecento*: the concept of *mathesis universalis*, its holistic understanding of theory and practice, symbiosis of art, *technê*, and science, interest in human anatomy, designing media and communications. By invoking them I address several problems: how the humanities should be dealing with digital technologies, how humanists should work, and what are the consequences of biomediations.

Resumen

En el siguiente artículo trazo las afinidades entre las ideas del Renacimiento y el viraje hacia lo digital en las humanidades contemporáneas. Hay una necesidad de definir este viraje refiriéndose a los importantes logros históricos del *quadro* y del *cinquecento:* El concepto de *mathesis universalis,* su comprensión holística de la teoría y de la práctica, la simbiosis del arte, *technê,* y de la ciencia, el interés en la anatomía humana, el diseño de los medios y las comunicaciones. Invocando todo aquello, planteo algunos problemas: Cómo las humanidades deberían lidiar con las tecnologías digitales, cómo los humanistas deberían trabajar y cuáles son las consecuencias de la biomedicación.

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1 El presente artículo consiste en una traducción a la lengua inglesa que vertió el mismo autor del texto autógrafo Renesansowe korzenie cyfrowego zwrotu, el cual forma parte del libro Zwrot cyfrowy w humanistyce, con el ISBN 978-83-936418-0-2 [N.E.].

Palabras clave
Viraje digital, Renacimiento, ciencia, humanidades, medios, teorías mediáticas, mathesis universal, bases de datos, homo faber, tecnología, biomédica.

Keywords
Digital turn, renaissance, science, humanities, media, media theory, mathesis universalis, da-ta base, homo faber, technology, biomedia.

The rhetoric and poetics of the digital turn are merely one of the many revolutionary narratives that have swept through the humanities in the last several decades. Apart from the digital turn, we have had other revolutions of the truly Copernican gravity and reach: the linguistic turn grounded in the structuralist tradition; the visual turn occasioned by visual technologies; the postmodern turn reflecting the status quo of the project of modernity and the consequences of industrial revolutions; and, the most recent posthuman turn related to the extension in the biological conditions of species' existence through technological progress. All these turns as much concern the perceptions and narratives of the world in the wake of the collapse of *grand histoire*, as evidenced by the conceptions of postmodernity, as they dramatically transform the condition of the humanities and their toolbox, which can be seen in the foregrounding of language and signs.

My own understanding of the digital turn in the humanities foregrounds the methodological transformation in the selection of strategies and tools of academic work, including databases, interfaces, software, and visualizations. In establishing both subjects and goals of their research, digital humanists combine quantitative and qualitative methods, seek to avoid the textual linearity of thinking and articulation in favor of generative models shaped by rhizomatic metaphors and algorithmic logics. Instead of traditional verbal narratives, they reach for visual codes as well as transmedial and interactive digital interfaces, which become platforms for the publication and popularization of research and theory. Last but not least, the digital turn questions the integrity of the subject as humanities enter the conversation with the discourses of genetics, cognitivism, transhumanism, and biopolitics. For digital humanists, culture is a field of the ever-expanding electrification and digitalization. Using digital imaginaries, tools, and networks of languages, semantics, and theories, digital humanities probes the meanings of the world undergoing digitalization. The discipline envisions the world as a huge digital database, which it explores and explains using a variety of digital interfaces (see Berry, 2011, n.d.).

Juxtaposed with earlier transformations mentioned above, the digital turn seems to be equally paradigmatic. At the same time, though, it can be viewed as a negative reflection of certain Renaissance phenomena that preceded 20th century anxieties and turbulences by several centuries. The end of the Middle Ages saw an equally, if not more, dramatic and radical reconstruction of the ways in which science, culture, and knowledge had been defined and understood. This revolution blazed trails for the Enlightenment project of modernity and created philosophical, technological, artistic, and economic conditions for the emergence of the digital project centuries later. Thus, it is in the Renaissance turn that I see the roots of our contemporary digital turn. What happened in the Renaissance science is happening again

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thanks to the digital turn, albeit the vector of change points in the opposite direction. I believe that the juxtaposition of Renaissance (r)evolutions with the ideas detonated today under the umbrella of digital revolution, such as information society, networks, interdisciplinarity, or mediatization, unveils divergent trajectories of the same civilizational logic. It also allows us to see the symbolic closure of a certain phase in the identity-shaping of knowledge, science, technology, and art as well as of mutual negotiations of their cultural relations.

In the following overview I will investigate, from the vantage point of the digital turn in the humanities, the Renaissance strategies of constructing the world, the elements of the knowledge-art-technology triangle, and their crucial relations to the world outside them. I will consider the notion of the identity of knowledge and its constituent scientific disciplines; the intersections between culture, practice, and scientific theory; the mathematical perception and conceptualization of the world; the awareness of forms of communication; and the humanistic analyses of anatomy. I will then demonstrate the resonances of these discourses with digital contemporaneity. I will focus on the analyses of academic work and the ways of generating and popularizing knowledge. Like the affinities between the spirit of Renaissance and the character of the digital turn, they also appear to resonate with the period's conception of the artist-researcher-artisan and the figure known in Hannah Arendt's philosophy as *homo faber*.

Renaissance

Interdisplinarity and Practical Theory/Theoretical Practice

For a Renaissance man, the cultural model was to combine competencies from fields currently perceived as disparate: the languages of culture, such as art, knowledge, and science, with various technologies and crafts. The period's individual moved in a zone still homogenous, in which contemporary disciplinary divisions, specializations, and practices gave ground to the ontic and axiological imaginary of the world's uniformity. It prevailed despite the ancient separation of *trivium* and *quadrivium*, *techné* and *episteme*, suggesting the distinction between skills connected with mechanics, and thus matter, and those tied to knowledge, which we now call theory. The Renaissance shapes of knowledge presaged modern, rational specializations in narrow fields, as currently scientifically conceptualized, which are always escaping away from one another in their incessant quest for perspective, method, and truth. Renaissance scholars maintained a lively dialogue in the emerging methodological and discursive practices, now known as

disciplines. They explained the world in accordance with their numerous dictionaries, seeking that which connects rather than divides.

In Greek and Roman hierarchies, knowledge and skills connected with matter and its mechanics, the crafts, were graded as the lowest, the least becoming a free man. This reflected the division between *techné* and *episteme*, the approach that the artists of the *cinquecento* rejected. They were simultaneously philosophers and craftsmen and were equally proficient in ideas and matter. Da Vinci and his contemporaries were very explicit about this: art is science and an artwork is both an idea connected to knowledge and its material manifestation. In fact, towards the end of his life, Leonardo considered himself more a man of science than an artist.

At the very beginning of his *Libro di Pittura*, da Vinci (2004, p. 1), nowadays considered the most emblematic of all Renaissance icons, exhorted aspiring painters to begin their careers with the thorough and comprehensive study of geometry and natural laws. Only when equipped with such knowledge, would they be able to express ideas and shapes in paintings as well as to approach aesthetics and axiological problems of art. In these words, the master expressed the contemporary conviction concerning the character of artistic activity and the competencies and skills necessary for the artist, who should possess as complete knowledge of mathematics, physics, philosophy, chemistry, and astronomy as possible. All this knowledge was required if one wished to engage in visual arts but also architecture, sculpture, and music. This integrated conception of art, culture, and work was also shared by other great masters of the period such as Filippo Brunelleschi, Raffaello Sanzio, or Michelangelo, all of whom were —not incidentally— also active as engineers and scientists.

Mathematicality – computing the world

The above aspects of the holistic nature of knowledge and their constant yoking with the aesthetic and artisan practice constitute a crucial characteristic of Renaissance culture. The trust in numbers and *mathematicality* of the world is another, equally important, factor in the quest for the roots of our current digital revolution. Mathematicality, the term I borrow from the Polish philosopher of science Michał Heller, has two discreet meanings.[2] The first of them is tied to the conviction of the superior role of digits and their grammar, that is, mathematics, in the construction of theories of the world, a perfect knowledge of its aspects and dimensions. In this sense, *mathematicality* holds mathematics to be a perfect method of building the objective knowledge of the world, a universal tool for its abstract models. The other use of the term describes the conviction borne out of the belief in the totality of this code, which translates the perfection

2 M. Heller (2006), *Filozofia i wszechświat. Wybór pism* [Philosophy and the Universe. Selected Writings]. Heller writes: "There is no rational world that is also not mathematical. [...] If the ontic mathematicality of the world is a sine qua non of its existence, then there is nothing around us that would not be mathematical" (p. 54). Later, he also writes: "It is a current assumption among physicists that it is the mathematical structure of physical theories that reveals (or better still, unveils) the deep structure of the world invisible to the general cognition" (p. 58).

of the mathematical knowledge of the world into the perception of reality as such. The mathematical view of the world makes it a set of numbers, or to use the cyber newspeak —a database—, and sees a variety of rules at work in these data. Perceived and interpreted through mathematical formulas, in the Renaissance cultural and scientific imagination and its resultant knowledge the world assumed the forms delineated in *Mathesis Universalis*, to use Gottfried Wilhelm Leibniz' later name, or Descartes' universal science.

Examples of mathematical thinking and its evolutions are omnipresent in the Renaissance science and art. The most obvious is geometric perspective, an abstract and calculation-based system of modeling reality developed in the period. Looking for a solution to problems in painting and architecture in the 15th century, the Florentine master Brunelleschi devised a geometrical grid for paintings, which he obtained by drawing lines on the empty canvas. The resultant rectangles covered a relatively small section of the painting's composition and the grid was to represent the dispersion of light in space, which, emerging from one point, traces outward rays. Expecting to cover the sketch with paint, the master wanted to maintain the proportions of shapes and lines traced by light. In the final version, when painted over, the grid became invisible. The technique irrevocably changed the artistic perception of the world and became a standard in a range of related crafts.

Brunelleschi's invention, as well as the work of another period master working in Germany —Albrecht Dürer—, also marked the development of the functional principles of contemporary, pixel-based and digital, visualization techniques. In the same way in which the perspectival grid of rectangular elements consolidates into a faithful reflection of the perceived reality, in digital visualizations our attention is not, in most cases, occupied by pixels themselves (which are simultaneously formal points of color in files and display points on digital screens) but by images emerging from the pixels' synergistic coexistence. There is also another affinity between the Renaissance structure and the contemporary standards of working with pixels. The perspectival grid resembles vector models prior to the rendering of pixels: an architecture of shapes used in a visual project is created first and then covered with a pixel "skinning." Contemporary images are steeped in the Renaissance perspective and they comprise rectangles/pixels, whose function resonates with the geometric grids of old masters (Edgerton, 2009; Field, 2005).

Yet another mathematical trace present in the cultural sensitivity and imagination was the golden section, in Latin known as *divina proportion*, the divine proportion. For artists, architects, and craftsmen such as printers or typographers, the section described the perfect shapes and proportions, which, when used in their projects, was to impart to them a metaphysical aura of universality. The golden section was also known to earlier architects

and builders of medieval cathedrals, such as Cathédrale Notre-Dame de Chartres. In the Renaissance times, it was sought by Gutenberg's imitators, who designed books and typefaces[3] (such calculations were present in Dürer's work devoted to symmetry) as well as painters, who defined the proportions of presented shapes the way Leonardo did in the famous drawing "Vitruvian Man" or "Mona Lisa." These, and many other, examples of mathematical thinking and negotiating the world made the Renaissance *mathematicality* a central principle, which paved the way for later theories of Leibniz, Descartes, and Newton as well as general Enlightenment sciences, which, through numbers, defined the sense of the world and charted its development.

Anatomy

Major among Renaissance emblems are the masters' works focused on anatomy and physiology of the human body, which, too, were perceived as holistic components of the human condition, often perceived as encapsulating the divine perfection. The human body was a perfectly symmetrical form, coded with the most refined of mathematical relations and proportions. Such artists as Da Vinci, Dürer, and Della Francesca studied the anatomy and the aesthetics of the human body. Looking for signs of the divine coding of figures and mathematics, they also looked inward, into human corporeality, still unexplored at the time. In *De Humani Corpis Fabrica*, Andreas Vesalius, one of the most famous anatomists and doctors of the period, challenged and reconstructed the canon of anatomical and medical knowledge going back to the antiquity and Claudius Galenus. As a result of increased activity of artists, doctors, philosophers, and chemists, the Renaissance became a time of the extraordinary accumulation of knowledge concerning the composition and functions of the human body, during which questions were asked concerning the nature of soul and mind, the manner of procreation, and the relations between the body and metaphysics. The period's scientists began the grand project of mapping the human body and the scientific explanation of its complexity, one that is still ongoing. Their attitudes and achievements allowed art to use professional knowledge of the biological man and engage it with artistic methods and sensibilities. Art contributed to the development of medicine and biology while they inspired the artistic discourses and supplemented its methods and crafts.

Defining the medium— typography and printing, technical drawings, visualizations

There is yet another Renaissance achievement that seems to be of consequence in the contemporary thinking about the digital turn – the discovery of cultural principles of mass media technologies. The Renaissance conceptualizes the idea of a medium and develops its first theories. Naturally,

3 On the golden section in typography see R. Bringhurst (2004, pp. 155-160).

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the period marks the inception of print, which allowed for a reorganization of the entire information ecosystem. The distribution of writing, or, strictly speaking, its technological, automatic replication, became possible and flourished. New methods of communication emerged, linked to the period's spirit combining art and knowledge as well as to the mathematical principles governing them. Along with the autonomous letter (font face), a functional basis of Gutenberg's invention, emancipated from the influence of the human hand and the gesture of writing that directed it, calligraphy transformed into typography, and the aesthetic thinking about crafts and their products became not unlike contemporary design.

The Renaissance intuitions connected with the construction of reality of communication technologies ushered in the epoch of the Gutenberg Galaxy, in which media technologies systematically acquired a position that increasingly counterbalanced the previous dominance of writing/text and assumed the function of a medial form independent of theology or culture. The primacy of text was, naturally, a consequence of the Christian conception of the word as the primal, irreducible breath of God, mostly clearly expressed in John 1:1-2. Contrarily, the Renaissance designed and mobilized media languages but also inspired the first discourses of this new situation, laying the groundwork for contemporary theories of media and communication.

Modernity

These four Renaissance accents should suffice to demonstrate affinities between certain historical developments and the condition of contemporary humanities as they poise themselves for the digital turn.[4] The Renaissance holism of knowledge about the world gave rise to today's interdisciplinarity and dialogs between sciences and humanities. The involvement in art, philosophy, medicine, and construction and engineering crafts corresponds with the contemporary Do-It-Yourself culture, a mode of participation which weakens the creators' authority over cultural texts. The search for mathematical precision and the principles of reality constitute the foundations of contemporary codes and digital machines as well as of the grand project of the digitalization of all culture. Anatomical and biological studies led to the development of modern medicine and natural sciences; in cyberculture, their echoes resonate in the post- and transhuman discourses of cyborgs and genetic code. Finally, the caution exercised in contacts with technologies and their cultural significance, resulting from the Renaissance trends mentioned above, stimulates the perspective of media theories, without which digital imaginaries would never transcend the technocratic capacities of calculating machines.

4 Another relevant Renaissance factor which strongly resonates with contemporaneity is multiculturalism, which was historically brought about by the crusades, the arrival of Arabs in Europe, 15th century geographical explorations, and colonial trade. Elsewhere, the influence of the Arabic geometrical imagination and mathematical culture on the continental scientific and cultural imaginaries deserves more attention, as do the intersections of post-colonialism and the digital project.

I have sketched so far a range of inspirations and reactions of the Renaissance imaginary that permeate the digital turn. As my main thesis assumes the affinities between this historical period and the contemporary humanities, I need to focus on the older models and standards that can enhance contemporaneity.

Homo faber

The first among them is the attitude and roles that researchers can and should assume as they immerse themselves in the digital turn. Digitality can be handled and programmed only from the perspective of inter- and transdisciplinarity. Various competencies are needed, related to software and hardware, matter and reflection, thought and action. The digital turn inspires, or—one is tempted to say —re-masters—, the *quattrocento* and *cinquecento* conceptions of integrated knowledge and science, their natural interchangeability/connectivity with technology and art, craftsmanship, and artistic ambition. The discussions of the digital turn can greatly benefit from the reflections concerning analogies in the creativity of the European Renaissance. The period's emblematic figure of the artist/engineer/designer/thinker/researcher/teacher perfectly fits the demands created by the digital landscapes of contemporaneity.

Hannah Arendt's (1998) philosophical investigation of the human condition is here a useful source in the discussion of the universal man (see Majid, n.d). Arendt defined the industrial, re-creative labor of individuals as a form of enslavement and an opposite of full life based on the unfettered activity and creativity. Following Arendt, one can consider *animal laborans* a figure close to the mass public of analog media which use passive literacy of media texts consumers incapable of speaking/writing them. Arendt contrasts this passive figure with its opposite –*homo faber*–, a worker emancipated from the thrall of repetitive, mechanical, and recreative labor, which also characterizes the age of media and mass culture. It is in this figure that Arendt elevates the sphere of action (*vita activa*), which, as a result of industrial mass production, Fordism, and mediatization of culture, has been devalued in the western culture and philosophy in favor of the reflexive and intellectual *vita contemplativa*. Consequently, the gap between a worker entangled in technopoly and an intellectual committed exclusively to thinking becomes homesteaded by a conscious craftsman whose perception and comprehension of reality allow no boundaries between that which is thought and that which is materially created. *Homo faber* combines reflexivity and action, re-forging them into an indivisible monolith of lived experience. Simultaneously, *homo faber* neutralizes politicized relations between the older conceptions of the private and the public, leading to the emergence

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–through his holistic activity– of the new public sphere without which the categories of social communication and social media make little sense.

Homo faber's models of activity were first realized by artists experimenting with media, for whom combining aesthetic and artistic sensibilities with engineering and mathematical knowledge proved to be a natural mode of work as well as a necessity in their contacts with increasingly complex formally media technologies. In new media art, the figure of a romantic artist has been supplanted with that of a technically-adept craftsman, a programmer, engineer, technologist, much-lauded in cyberculture and equipped with critical sensibility and artistic imagination. As a media craftsman, *homo faber* combines post-industrial and *prosumptive* practices, both material (*hardware –vita activa–*) and symbolic (*software –vita contemplativa–*). He sculpts, builds, strings, decorates, and networks. He constructs and reconstructs a medial world, decolonizing it from under the media system of mass culture.

The world of digital media is a space occupied by a digital *homo faber*, emancipated from the divisions and rules of analog technologies and political media systems. Contemporary geeks, hackers, designers, and programmers do not recognize artificial divisions between creative activity, work, and metaphysical contemplation of life. Previously disjointed, these spheres of contemporary life attract each other and integrate in the everyday pragmatics of action. The era of enlightened specializations and objective laws ascribed to various discourses, fields, and disciplines is thus superseded by the holistic vision of cultural activity –of living and being in the world–, the very same vision that gave us the Renaissance.

Thanks to media art and its practitioners, knowledge and science are now returning to the world of art, but –given the ongoing progression of media technologies– this new integration requires the knowledge of programming, physics, engineering, or typography. In many ways, this positions media artists as avant-gardists. The model of artistic uses of media is also reflected in the practice of programmers and media engineers who, often lacking skills related to graphic design, typography, psychology of colors, or anthropology of interaction, are not capable of completing their projects. Engaged in digitality, *homo faber* is forced to continually reach out to various domains of knowledge and integrate them in his media-related activities. He effectively becomes a craftsman of media matter (hardware) and a philosopher/theologian of media ideas (software) –an artist who in his works integrates these domains and invests them with culture–. Peter Weibel, one of the most important contemporary media artists and curators, summarizes this new integration by paraphrasing the words of Erasmus of Rotterdam: "a media artist cannot be uninformed—he has to be a scientist!"[5] The same holistic spirit of the digital project also permeates the thinking of the Polish

5 Private interview with Peter Weibel, Karlsruhe, Germany, July 2012.

new media and art researcher Piotr Zawojski, who, defining cyberculture, emphasizes a syntopic imbrication of art, science, and technology which constitute and define it (Zawojski, 2010).

The philosophical understanding of digitality in the spirit of Renaissance ideas invoked by Arendt in the *homo faber* figure is also present in the work of Ben Shneiderman (2002), a professor of computer science interested in the evolution of computer systems, who sees these ideas in the paradigmatic transition from old computing to new computing. Within the old cyber-technological ecosystem, man was the last, additional link whose task was to instruct a machine to perform a sequence of operations, to supervise the correctness of operations, and to receive the results. At the center of the cybernetic world was the computer: its cores, calculations, capacity for information storage, and ability to link with other machines. The transition to new computing, Shneiderman (2002) suggests, requires the deconstruction of this machine-centric phase. This involves a shift of the engineering, technocratic center of the cybernetic world, predicated on the scientific parameters, towards the human and its potential, which was also a central point of reference for Renaissance humanists. New computing ought to focus on values recognized by target users: their sensibilities, needs, capacities, and limitations. Another, parallel transformation involves a shift from automatic, machine-centered tasks to user-focused models of service and resource delivery, what has been called universal usability. New computing is to be a cultural narrative which replaces the elevated icon of technological revolution, the computer, with its user for whom the computer is merely a tool. Examples of the subject-oriented thinking about the digital world are numerous; one of them is the Do-It-Yourself movement which is informed by the passion for creative meddling with existing media but also by the idea of grassroots alternatives to officially distributed technological solutions.[6] The DIY culture opposes the homogenic and hegemonic mass culture in which the elites distribute system-wide, ideologically-correct interpretations of reality in order to sustain their status quo. The contestation of such orders can be found in other phenomena invoked in the contexts of cyber-cultural change: participatory culture and Web 2.0.

The computing turn postulated by Shneiderman can be easily understood as a reversal of processes observed by Arendt. Just as *homo faber* replaced *animal laborens* of the media world, the digital circumstances emancipate consumers/receivers, who become craftsmen/creators. *Leonardo's Laptop*, the title that Shneiderman (2002) gave to his book, entails computing in the hand of a Renaissance individual who is both an artist and a programmer, an architect and a purveyor of electronics, an anatomist and a database/search engine operator. The media *homo faber* is a universal figure that holistically practices digital and network technologies as artistic and technical, material

6 For more on visions and narratives that have shaped the digital project see R. Barbrook (2007).

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and idea-based, communicative and cognitive. Given the current phase of the development of art, technology, and digital media culture, media artists are the closest to this model. Technologists and technocrats, on the other hand, are not so easily swayed by the holistic vision of cybercultural development. Convinced of the superiority of the scientific, mathematical vision of technology, they do not see any room for other elements. The reintroduction of the holistic sensitivity to the world as the new cultural competence remains one of the chief challenges of our era.

Craft and Art – A New Culture of Knowledge

It remains an open questions to what extent the unique approach of the Renaissance will translate into analogous changes in our spheres of life, including science, generation of knowledge, and education. There are indications that the new version of knowledge and science, tied to the digital turn and constitutive of it, may be positioned as an unwelcome competitor, as it has happened with earlier encounters between traditional art and media. On the eve of the digital era, technology has once again found a place for itself in art and culture, even if its position remains somewhat problematic in relation to the traditional artistic system. Radical theorists of media art, like Peter Weibel, are convinced that in the face of the mediatization of contemporary culture there is no art other than media art. The history of art, just like the history of culture in general, is marked by the dialogs with artistic forms, materials, techniques, and discourses. McLuhan's dictum that the fate of a text is determined by a medium that transmits it also holds here. The dominant cultural discourse of art has remained cautious, if not downright reluctant, about media art, refusing to recognize its autonomy and perceiving it primarily as technological, gadget-oriented folklore which remains decidedly derivative in relation to the traditional artistic semiosis. The position of media art during contemporary art events remains marginal. Fortunately, it has developed its own circulation, whose significance grows in concert with its contestation of the existing artistic discourse. This contestation extends beyond aesthetics or semiotics –it is, first and foremost, political–. Thanks to its egalitarianism and interactivity in communicating with users (the principle of Web 2.0), media art stands in political opposition to the elitist art, predicated on the principles of limited access and passivity (Weibel, 2005).

I am apprehensive that a similar fate will befall digital humanities in the initial phase of the digital turn. Both discourses, digital media art and digital humanities, have been developing outside the mainstreams from which they emerged and whose sensibilities and methods they have inherited. Occasionally, they exchange resources and strategies with their mother fields thanks to artists and curators interested in culture and technology, as well as researchers, institutions, and events engaged in these intersections. In a

sad parallel to the decades-long exclusion of media art, digital humanities may become ostracized and ignored. Its technological enthusiasm, trust in digital databases, engineering methodology of their exploration and analyses, ubiquitous interfaces (info-aesthetics, data visualization, software), and the new digital literacy stimulated by all of them –these will almost certainly not find much acceptance in academic circles, which are not only governed by the criteria of truthfulness, objectivity, and methodological openness, at least since Paul Feyerabend's anything goes manifesto (Feyerabend, 1975) . Central to them are also tradition, market forces, institutional politics, and the systemic character of the scientific and educational sector. The academia in general and humanities in particular have yet to agree on the meaning and nature of so many recent turns: linguistic, postmodern (cf. controversies regarding academic methodologies), or visual (cf. controversies surrounding the thesis of the dominance of images and the culture of simulation). However, regardless of the current condition of the digital turn, I do believe that its influence will become increasingly pronounced in a long run.

Biomedia

Apart from the interdisciplinary as well as practical/theoretical focus on the analysis of digital databases and the construction of new, post-textual interfaces, the digital turn has also reached out towards the discourses of biology, genetics, and humanity, which figured so strongly in the Renaissance. Just as for the period's masters anatomy and physiology were inextricably connected to art, crafts, and philosophy, so contemporary humanists, under the banner of transhumanism, challenge the earlier conception of communication as specific for human beings only. Engaged in the deconstruction of the subject as such, they are convinced, in the dualistic, Cartesian tradition, that body and spirit are in humans separable using digital technologies. They define communication as a state achievable not only between human consciousness and its technological environment but also perceive it as a trans-species space within which various living species can communicate with each other as well as with and through technologies. The transhumanist discourse is thus accompanied by a discussion of trans-biological mediations – biomediations and their biomedia–. These concepts are predicated on one of the most important axioms of cyberculture, whose character is as misleading as it is world-changing: genetic material is a code. This has far-reaching consequences for understanding genetics, which has developed parallel to the digital project, shares a number of affinities with it, and is even often invoked in conjunction with it, if not positioned as its subset. If DNA is indeed a code in the cybernetic sense, then it can be programmed and genetic molecules can be manipulated in the same manner in which bits, packets, and algorithms are manipulated in software. Like Renaissance art, contemporary art and science remain close to the

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knowledge of life; they attempt to recognize and ask ontic, axiological, and phenomenological questions concerning the limits of communication as well as the meaning of nature and technology. The biomedia discourse resonates strongly with the Renaissance investigations of corporeality. The Renaissance anatomical studies superseded the boundaries of the human body. Humanism interrogated not only the metaphysics of the human life but, through holism, attempted to explore the material in which the spirit resided. Great artists like Leonardo and biologists like Andreas Vesalius were guided by the same principles as contemporary biomedia artists such as Eduardo Kac and Paul Vanouse.

Conclusions

It is not difficult to see a number of conclusions regarding the affinities between the Renaissance experience and the digital turn. The first of them is connected with the integrated, holistic perception of the world which should accompany humanities and sciences. The discourses of social sciences and humanities must re-acquire a tradition of interrogating the world and framing it as an object of study in the way which accounts for the existence of multiple and equally important languages of description and construction but also remains open to other vantages and methodologies. The ever-increasing distance and competition between sciences and humanities seems profoundly harmful here. Academic research should again strive for integrated knowledge rooted more in attempts to overcome specific limitations of disciplines and less in the arms race of various fields, paradigms, and methodologies. Humanities should learn how to reach for art and technology in order to keep up with the ever-changing world and make this currency its main advantage. Among the three cultures, humanities are the most vulnerable to self-referentiality, discursive autism, and progress-reluctant worldviews.

The second conclusion is tied to the position of a researcher. I do believe that the role of a distanced and rational observer and analyst should be abandoned in favor of the *homo faber* figure. Only when immersed in reality under investigation as a co-creator and "programmer" using artistic methodologies and wielding digital technologies, can such an analyst attempt to construct a holistic vision. This is particularly important given the software principles of digital technologies, which make them both the object of study and a process, a potential but also an embodied state, brought into existence through the very forms of interfaces. Media investigations from the distance of academic disciplines, methodologies, and paradigms are burdened with a potential blindness to their complexity, fluidity, and totality. Moreover, it is not a focus on media themselves that is at stake here, but a mediatic perspective, even if any research in digital

culture or digital research in culture implies such relations to a certain extent. All researchers of culture should adopt similar positions. It is no longer practical to look at digital technologies as episodic and marginal. There are no states of culture that remain today outside the tectonics of digital machines and networks. Research methods and strategies should largely yield to the digital infection. This concerns both general and specific issues. Among the former are the inclusion, next to the dominant text-centric tradition, of approaches focused in the analyses of visual culture or mathematics; the recognition of the centrality of the database in cultural and social transformations; and the acceptance of the erosion, if not collapse, of the category of "medium" and its replacement by software and interfaces. The latter include the recognition of need for pursuing media theory as a techno-artistic-philosophical support in both broader discourses and specific methodologies in humanities.

The third conclusion concerns the increasing competition between various actors using digital data to generate knowledge and information policies. Guided by the traditional ethos and relying on verifiable scientific methods, academic institutions are forced to race in the digital world with entities which, with their access to but also their generation of data, can conduct sophisticated analyses informed by agendas and methods different from those current in academia. Acquisition and access to data nowadays ceases to be an issue; a capacity to process it becomes one. Corporations managing social data, such as Facebook and Google, become increasingly proficient in using this information but are also less bounded by legal, axiological, or technological concerns in using it to ends other than the generation of widely-accessible knowledge. More and more, they engage in secret, unsupervised analyses of their databases which are aimed at commercial applications. Commercial and technocratic strategies of acquiring, analyzing, and using such information patently contradict scientific ideals which, using similar data, offer open, thorough, and critical perceptions of reality. Social sciences, such as sociology, will need to struggle for survival in their academic form, when they finally lose access to large amounts of high-quality data available to corporations whose networking projects equip them with users' seemingly infinite number of digital footprints. The struggle for critical knowledge, free of market simplifications and methodological deficiencies, will be essentially the same struggle that Renaissance people fought to become recognized as they crossed disciplinary borderlines and integrated varied sensibilities and competencies in their work.

The digital turn is a chance to recover some aspects that have gone missing from contemporary academic study but which can be easily found in the past. The Renaissance breakthrough can function as an efficient point of reference and a matrix for designing contemporary change. As we gaze technologically

into the future of humanities and reroute them onto digital tracks, we need to remember about the inspiring heritage which teaches us about the utility of interdisciplinarity, and the validity of combining theory and practice, *vita activa* and *vita contemplativa*, in the fascinating intersections of thinking, technology, and art; inspires us to reach for varied work methods and interfaces in the popularization of findings; and compels us to seek incessant networking and interactivity. Defining the future must be grounded in remembering the past. If it is not, it will, once again, become an empty self-serving call to perpetuate pseudo-intellectual jargon and disciplinary marketing.

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Galeria

One of Leonardo's many sketches demonstrating the mathematical principles used: the lines of geometrical perspective and the pre-pixel grid. 2.bp.blogspot.com/__c9qWlUD8Qs/TNRU8TfsBOI/AAAAAAAANLc/GjQCxOxLUNw/s1600/davinci_drawing.jpg

A drawing of the representation of perspective used in Florence by Filippo Brunelleschi. maitaly.files.wordpress.com/2011/04/0328p_duomo6_b.jpg

A tool to reproduce the geometric grid in Albrecht Dürer's drawing. The illustration comes from Albrecht Dürer's *De symmetria partium in rectis formis humanorum corporum / Underweysung der Messung* (1538). employees.oneonta.edu/farberas/arth/Images/ARTH_214images/Durer/durer_perspnude_large.jpg

Mechanical creation of a perspective image. The illustration from Albrecht Dürer's *De symmetria partium in rectis formis humanorum corporum / Underweysung der Messung* (1538).www.uh.edu/engines/epi138.htm

Albrecht Dürer's typographical calculations. His typefaces were the result of intense philosophical and mathematical research. The illustration from Albrecht Dürer's *De symmetria partium in rectis formis humanorum corporum / Underweysung der Messung* (1538). upload.wikimedia.org/wikipedia/commons/1/15/Duerer_Underweysung_der_Messung_132.jpg

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The Oscar-winning director Zbigniew Rybczyński talks with Piotr Krajewski about the scientific images of renaissance masters. www.artisttalk.eu/zbigniew-rybczynski-pl/