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Why Go from Texts to Data, or The Digital Humanities as A Critique of the Humanities

Ioana Galleron¹ and Fatiha Idmhand²

¹LATTICE, UMR 8094, Université Sorbonne-Nouvelle; ² ITEM-CNRS, UMR 8132, Université de Poitiers

E-mails: ioana.galleron@sorbonne-nouvelle.fr; fatiha.idmhand@yahoo.es

Abstract

Digital humanities are accused of contributing to the decay of Academia in general and of betraying the humanities principles. Through looking at the developments of the field, as well as at its research principles and practices, this article seeks to refute such an allegation, and to show that the passionate debates the digital humanities still raise are related to their critical stance towards 'traditional' SSH research. In the first part, the collaborative and FAIR principles (Findable, Accessible, Interoperable and Reusable) that characterise DH approach are examined, in connection with the dissatisfaction they express towards the established research practices and organisation. Based on an example of the exploration of the archives of the Hispanic 20th century vanguard, the second part focuses more specifically on the challenges of working with data and of haptic thinking in the literary and cultural fields.

Keywords: Digital Humanities *epistemology*, *SSH research process*, *haptic thinking*, *textual data creation*, *metadata analysis*, *Hispanic Satellites*

Amongst the recent research trends in academia, the Digital Humanities are the most exposed to the reproach of departing from the university tradition of forming students to critical thinking, in order to train them in various soulless technologies, out of which none or little wisdom is to be gathered. Even if the field has become, as Ted Underwood sees it, 'a semi-normal thing',¹ and in spite of a more nuanced vision about the educational approach adopted by Digital Humanities specialists,² extreme assertions continue to be made about its collusion with the BigTech companies, its practitioners as 'not answering' research questions in the humanities, and about a supposed tendency to replace humanist knowledge with mere technical expertise.³ Humanists playing with computers appear in danger of forgetting their traditional mission, to the sake of building representations that catch the eye and divert the mind. Instead of accruing meaning, Digital Humanities constitute therefore, for some, a menace of text impoverishing and of

¹ Ted Underwood, 'Digital Humanities as Semi-Normal Thing', in *Debates in the Digital Humanities 2019*, eds Matthew K. Gold and Lauren F. Klein (Minneapolis and London: University of Minnesota Press, 2019); available at <https://doi.org/10.5749/9781452963785> [accessed 13 August 2020].

² Laurent Teissier, 'Les Humanités numériques, combien de divisions? Éléments pour une sociologie critique de curricula d'éducation au numérique en sciences humaines', *Revue Zilsel* 2.7 (2020): 355-85.

³ Daniel Allington, Sarah Brouillette and David Golumbia, 'Neoliberal Tools (and Archives): A Political History of Digital Humanities', *Los Angeles Review of Books* 2016, available at <https://lareviewofbooks.org/article/neoliberal-tools-archives-political-history-digital-humanities> [accessed 13 August 2020]. For a specific answer to the claims of this piece, see Brian Greenspan, 'The Scandal of Digital Humanities', in *Gold and Klein*.

building artefacts that have more to do with Guy Debord's 'society of the spectacle' than with the expectations linked to solid scholarship.⁴

To contest these (mis)representations, scholars in digital humanities have repeatedly advocated that they accomplish humanistic work with computational methods⁵ and that the distance between digital and non-digital approaches is not so great, at least in certain domains.⁶ Faced with material concerns, numerous are the digital humanists trying to demonstrate that their practices and demands are not a threat to the humanities, while offering solutions for engaging at a very low cost with the methods and technologies developed in the field.⁷ Most presentations of Digital Humanities curricula or research projects insist on the fact that the objects submitted to scrutiny remain those that matter to humanists in general, and that, in spite of the collaboration with computer scientists, the scholars involved in Digital Humanities are not leaving the field of the humanities.⁸ For the authors of a book such as *Digital Humanities*,⁹ or for a philosopher such as Milad Douehi,¹⁰ the digital is opening the era of a new humanism, as full of possibilities as the one Europe knew during the 16th century. Other discourses prefer to insist upon the novelty of the results that Digital Humanities can bring on – or, put otherwise, on their usefulness.¹¹ All in all, the prevalent attitude remains a defensive one, and a clear desire to be accepted by 'traditional' humanists informs such various discourses. This need becomes even more stringent in a context of shrinking SSH research budgets, with digital humanists suspected of 'adapting' to new managerial discourses so as to capture as much money as possible, to the detriment of established disciplinary groups or schools of thought. Digital Humanities appear as

⁴ See in this sense, amongst others, 'personally, I don't like the connotations that come with the "Big Tent" label: it paints digital humanities as a transitory spectacle with all the connotations that come with the circus' (Melissa Terras, 'Peering inside the Big Tent', in *Defining Digital Humanities: A Reader*, eds Melissa Terras, Julianne Nyhan, Edward Vanhoutte (Farnham: Ashgate, 2013), 267). For 'society of spectacle', see Guy-Ernest Debord, *La Société du spectacle* (Paris: Buchet/ Chastel, 1967), esp. chapter 8, "Negation and consumption in culture". Here and in the text, our translation. All translations from French are ours if not otherwise specified.

⁵ Kathleen Fitzpatrick, 'The Humanities, Done Digitally', in *Debates in the Digital Humanities*, ed Matthew K. Gold (Minneapolis: University of Minnesota Press, 2012); available at <https://doi.org/10.5749/9781452963754>. [accessed 13 August 2020].

⁶ Barbara Bordalejo, 'Digital versus Analogue Textual Scholarship or The Revolution is Just in the Title', *Digital Philology: A Journal of Medieval Cultures*, 7.1 (2018): 7-28; available at <https://doi.org/10.1353/dph.2018.0001> [accessed 20 August 2020].

⁷ Sarah H. Ficke, 'From Texts to Tags: The Digital Humanities in an Introductory Literature Course', *CEA Critic*, 76.2 (2014): 200-10.

⁸ See for instance the presentation of the Master in Digital Humanities at Tufts University; available at https://asegrad.tufts.edu/academics/explore-graduate-programs/digital-humanities?utm_source=Keystone&utm_medium=digital&utm_campaign=GSAS [accessed 15 September 2020], or at the University of Ca'Foscari in Venice; available at https://www.unive.it/pag/38917/?utm_source=Keystone&utm_campaign=Keystone&utm_medium=KeystoneListing, [accessed 15 September 2020], to quote only two examples insisting on the importance of understanding cultural heritage as integrative part of a curriculum in Digital Humanities.

⁹ Anne Burdick, Johanna Drucker, Peter Lunenfeld, Todd Presner and Jeffrey Schnapp, *Digital Humanities*, (Cambridge, MA and London: The MIT Press, 2012), esp. 7.

¹⁰ Milad Douehi, *Pour un humanisme numérique* (Paris: Éditions du Seuil, 2011). For a complementary approach, see Marin Dacos, 'Vers des médias numériques en sciences humaines et sociales: une contribution à l'épanouissement de la place des sciences humaines et sociales dans les sociétés contemporaines', *Tracés*, special issue: 'À quoi servent les sciences humaines (IV), Fin de partie' (2012): 205-23; available at <http://traces.revues.org/5534> [last accessed 15 September 2020].

¹¹ Franco Moretti, 'Abstraction, motifs récurrents et forme', *Revue d'Histoire Littéraire de la France* 116.3 (2016): 521-32; available at <https://www.jstor.org/stable/24890578> [accessed 15 September 2020]. Out of the numerous papers by Franco Moretti, we chose to mention this one, issued from a conference addressed to a 'profane' public, and taking as a consequence a more visible stance in defence of the digital humanities.

furthering the divide between researchers,¹² or even between institutions,¹³ since they involve inaccessible logistics and infrastructure for certain individuals, research centres and universities.

Taking a step back from this sparring match between defenders and detractors of the digital humanities, one could point out to the fact that the humanities cannot afford not to take the digital turn, whatever its dangers may be. Nowadays technological and related societal changes are such that it would be foolish to ignore them. Even scholars most attached to pen and paper do not deny the usefulness of digital facilities and devices for accessing, perusing, manipulating and communicating texts and other visual and / or auditive documents. As much as airplanes for covering long distances, computers become unavoidable aids for continuing to produce knowledge within a reasonable timeframe and considering if not all elements, at least an unparalleled number of meaningful occurrences. Whether this aid is limited to 'mechanical' aspects of our work, or involves deeper epistemic and structural changes (a position that the authors of this essay tend to favour, following Matthew Driscoll and Elena Pierazzo's arguments),¹⁴ Digital Humanities constitute an unavoidable evolution. As a consequence, digital editing, once practiced by a marginal number of scholars, is rapidly spreading, with an ever-increasing number of various electronic libraries multiplying on the net. Still, digital humanities remain surrounded by an aura of suspicion and scandal, and regularly attract virulent criticism, as if, to the difference to other disciplinary innovations and disruptive proposals (such as 'cultural studies', that caused quite a turmoil in the humanities at their beginnings), a full 'normalization' of digital humanities was impossible.

Starting from this astonishment with the amount of passion the debates about the digital humanities still raise, after so many years and so many arguments already produced in favour of the field, our article aims to offer a different understanding of the phenomenon. Keeping ourselves at some distance from the 'economy of promises'¹⁵ in which most defence discourses are rooted, and fully acknowledging the disruptive effect of the digital humanities, our position is to consider that much of the suspicion manifested towards the digital humanities comes from the fact that they expose in sometimes embarrassing ways some limitations of the 'traditional' research, such as the reification of canons necessarily linked to a process of continuous selection of the works, the rhetoric rather than a demonstrative approach adopted in many discourses, or the lack of openness with regards to the sources, the methods and sometimes the results of researches in the SSH. Thus, this article aims at reconsidering the digital turn in the humanities not (only) as an extension of the humanities, or an historical necessity, imposed to the humanists mostly from the outside, but as an answer to older dissatisfactions with established practices, questions, methods and even epistemologies. Most certainly, digital humanities are not the only ones to point towards the flaws of the humanistic researches, but they constitute nowadays, in our opinion, the most articulated effort, rooted in the humanities themselves, to solve these problems. Far from being a form of 'hype' – an attitude that digital humanists are the first to reject –,¹⁶ they are fuelled by a hope to radically change the game, thanks to the change in

¹² See Adeline Koh, 'A Letter to the Humanities: Digital Humanities Will Not Save You'; available at <https://hybridpedagogy.org/a-letter-to-the-humanities-dh-will-not-save-you/> [accessed 15 September 2020]

¹³ Bryan Alexander and Rebecca Frost Davis, 'Should Liberal Art Campuses Do Digital Humanities? Process and Products in the Small College World', in *Debates in the Digital Humanities*, ed. Matthew Gold.

¹⁴ Matthew James Driscoll and Elena Pierazzo, 'Introduction: Old Wine in New Bottles?', in *Digital Scholarly Editing: Theories and Practices*, eds Matthew James Driscoll and Elena Pierazzo (Cambridge: Open Book Publishers, 2016), 1-15, available at <http://dx.doi.org/10.11647/OBP.0095> [accessed 15 September 2020].

¹⁵ See Harro van Lente, *Promising Technology: The Dynamics of Expectations in Technological Developments* (Delft: Eburon, 1993).

¹⁶ For a nuanced example of rejection, see Natalia Cecire, 'When Digital Humanities Was in Vogue', *Journal of Digital Humanities* 1.1 (Winter 2011); available at <http://journalofdigitalhumanities.org/1-1/when-digital-humanities-was-in-vogue-by-natalia-cecire/> [accessed 15 September 2020].

perspective on the sources that the digital brings. As such, they become both the object of much criticism, and a rallying point for other initiatives and innovations in the humanities, as we will try and show in the first part. In the second one, we will turn towards the most salient novelty elements characterizing the digital research, such as the use of ‘data’ and the exploratory stance they often take, in order to better understand how the digital is trying to change humanistic practices and principles. To do so, we will regularly illustrate our ideas with examples taken from a project in the field of Hispanic literary history, presented here not as a model to be followed, but as a case study helping us to enforce some points in hand.

Digital Responses to Older Dissatisfactions

Digital Humanities were not born yesterday, and, as it has been repeatedly demonstrated, their history dates back to the end of the 1940’s.¹⁷ The pervasive feeling about their recentness is probably related to the fact that curricula in digital humanities have not been offered until quite recently in the universities – roughly at the end of the 1990’s and the beginning of the 2000’s in the English-speaking countries, and some four or five years later in Europe.¹⁸ Digital humanities have developed, in fact, much more in a ‘horizontal’ rather than ‘vertical’ way, with confirmed scholars becoming digital humanists – some would say, ‘converting’ themselves to the digital tools –,¹⁹ rather than with young students eager to experiment with computers, even if these early career researchers are not absent, of course, from the field. More than any other humanistic discipline, digital humanities are fond of summer schools and other similar short training facilities, not integrated in structured university curricula and suitable, therefore, for further education of researchers more or less recently engaged in a full-time scientific career. As such, digital humanities appear to respond to a desire for change from practitioners who have been sometimes as far as one can go in a discipline, and who come to the digital out of a form of frustration with the methods and questionings they have been trained to.²⁰

The same frustration is to be read in the tendency of the digital humanities to experiment with new ways for collaborating and scholarly communicating. The organization of a series of ‘ThatCamps’, also entitled ‘non-conferences’,²¹ is one of the most salient examples of

¹⁷ See Susan Hockey, ‘The History of Humanities Computing’, in *A Companion to Digital Humanities*, eds Susan Schreibman, Ray Siemens and John Unsworth (Oxford: Blackwell, 2004); available at <http://www.digitalhumanities.org/companion/view?docId=blackwell/9781405103213/9781405103213.xml&chunk.id=ss1-2-1> [accessed 15 September 2020].

¹⁸ This does not mean that computing education was not offered before to students, both in the USA and Europe, as shown, for instance, in the ACO*HUM survey quoted in *Computing in Humanities Education: A European Perspective*, eds Koenraad de Smedt, Helen Gardiner, Espen Ore, Tito Orlandi, Harold Short, Jacques Souillot, and William Vaugh (Bergen: University of Bergen, HIT Centre, 1999); available at <http://www.hd.uib.no/AcoHum/book/> [accessed 16 September 2020]. However, in his book on *Digital Humanities Pedagogy: Practices, Principles and Politics* (Cambridge: Open Book Publishers, 2012), Brett D. Hirsch still observes that full curricula in the Digital Humanities are still infrequent (7-11). See also John Unsworth, ‘A Master’s Degree in Digital Humanities at the University of Virginia’, paper presented at the 2001 Congress of the Social Sciences and Humanities, Université Laval, Québec, Canada, May 25, 2001, available at <http://www.people.virginia.edu/~jmu2m/laval.html> [accessed 16 September 2020].

¹⁹ See Milad Douehi, *La Grande Conversion numérique* (Paris: Seuil, 2008).

²⁰ The very story of the ‘founder father’ of the digital humanities, Father Roberto Busa, can serve here as an argument: dissatisfied with the traditional studies on Thomas Aquinas, he turned to computer science for help. See Thomas N. Winter, *Roberto Busa, S.J., and the Invention of the Machine-Generated Concordance* (Lincoln, NE: University of Nebraska, 1999).

²¹ For more information about THATCamps, see <https://thatcamp.org/about/>. In particular, see the Proceedings of THATcamp 2012: *THATCAMP PARIS 2012. Non-actes de la non-conférence des humanités numériques* (Paris: Éditions de la Maison des sciences de l’homme, 2012); available at <http://books.openedition.org/editionsmsh/278> [accessed 15 September 2012].

this tendency, but it is not, by far, the only one. While continuing to write books and to publish peer-reviewed papers, conference proceedings and other types of output that are familiar to 'traditional' humanists too, digital scholars engage willingly in the practice of blogging, disseminating findings via social networks, discussing actively more or less arcane questions on diffusion lists, and so on.²² Taking a leaf from the scientists' books, digital humanists favour collaborations via projects, and maintain a strong 'maker' culture.²³ Once again, by no way aren't we trying to pretend that digital humanists are the only ones to do so, but their presence in the alternative scholarly communication sphere, as well as the collaborative work tendency, are undeniably extremely high, and relate undoubtedly to some form of frustration with the established ways of circulating new ideas and building new knowledge in the humanities.

Amongst humanists, those promoting digital humanities have also been amongst the first to embrace the open access movement initiated in the so-called 'hard' sciences,²⁴ and in recent years they became extremely engaged in promoting FAIR principles.²⁵ By inviting their researchers to produce datasets, visualizations and interpretations that are findable, accessible, interoperable and reusable, the digital humanities are not only bringing to the fore ideals of openness, cooperation and transparency that are deeply humanistic, but are also questioning pre-existing practices and the dominant vision about scholarship in certain SSH disciplines, still strongly articulated around the idea of a scholar working alone on a specific object out of which he or she produces new knowledge, thanks to his or her intuitions and exceptionally linguistic skills. Admittedly, FAIR principles remain to date much more an appeal, or even a form of wishful thinking, than a reality. However, these drawbacks have much more to do with pre-existent reflexes in academia, such as the wish to 'keep' one's work to oneself, or to obscure steps taken to get to a result, than with the specificities of the digital work. It is also important to take into consideration the fact that rendering electronic resources FAIR is not as straightforward as 'traditional' publication via more or less well-established journals and publishing houses. Putting FAIR principles into practice is challenging, especially when this practice concerns large groups of researchers working on diverse objects of study, protected by different copy-right laws and digitized with different principles in mind, as it is the case within the French CAHIER consortium in which the authors of this article are also involved.²⁶

Another argument about the dissatisfaction with 'traditional' research that informs the digital humanities and explains the continuous uneasiness they produce, is the very dynamism of the field. Digital humanities seem able to 'absorb' virtually all thematic and ideological innovations in the humanities. In their introduction to the already quoted volume *Debates in the Digital Humanities 2016*, Klein and Gold describe an expanding movement²⁷ during which Digital Humanities have gradually become aware and tried to solve problems of accessibility and sustainability, while engaging with issues of race and gender (amongst others). Looking at

²² These dissemination activities are to be seen not only as a complement, but even as a will to 'hack the academy'. See Dan Cohen and Tom Scheinfeldt (eds.), *Hacking the Academy: A Book Crowdsourced in One Week* (Ann Arbor: Digital Culture Book and University of Michigan, 2011), otherwise debated upon in the review-section of the present issue, as well as Pekka Himanen, *The Hacker Ethic and the Spirit of the Information Age* (New York: Random House, 2001).

²³ See for instance the course on 'Design Thinking and Maker Culture' offered on DariahTeach Website; available at <https://teach.dariah.eu/course/view.php?id=54§ion=0> [accessed 16 September 2020].

²⁴ Let us remember here that the first platform for open access papers, ArXiv, was launched in 1991 by a physicist. On the history of Open Access, see Peter Suber, *Open Access* (Cambridge, MA: The MIT Press, 2012).

²⁵ Findable, Accessible, Interoperable and Reusable. See <https://www.go-fair.org/fair-principles/> [accessed 16 September 2020].

²⁶ For a presentation of CAHIER, see <https://cahier.hypotheses.org/le-consortium> [accessed 16 September 2020].

²⁷ More precisely, they talk about an 'expanded field' in their introduction. See <https://dhdebates.gc.cuny.edu/read/untitled/section/14b686b2-bdda-417f-b603-96ae8fbbfd0f#intro> [accessed 16 September 2020].

the contents of the above-mentioned book, which turned subsequently in a series of books, one may notice that the 2019 issue made room for a specific section dedicated to ‘Ethics, Theories and Practices of Care’, alongside with the expected parts speaking about ‘possibilities and constraints’, ‘theories and approaches’, ‘methods and practices’ in the Digital Humanities. Moreover, contributions in these other parts target questions related to ‘Gender and Cultural Analytics’, ‘Critical Black Digital Humanities’ or to the ‘Digital Working Class’, proving thus that the critical and social innovations are deeply inscribed in the digital humanities projects. The very fact that the question ‘what are digital humanities?’ is still not settled,²⁸ goes in the same sense, inviting us to see the field not only as a trading zone²⁹ or a ‘disciplinary common’,³⁰ but as an alternative space of expression for scholars from extremely diverse disciplines who have in common the need to find new outlets for certain ideas, questions and even a way of being, all of which are not exactly welcome in their ‘home’ disciplines.

Most importantly, digital humanities seem to grow, as much as from technological evolutions, from an acute awareness about the limits of the established scholarly models when it comes to dealing with the complexity of modern-day scientific objects.³¹ Since the 18th century, we assist to a continuous multiplication of sources, to a relentless rediscovery of the past, to the emergence of new forms of contextualization of these discoveries and to the exercise of a perpetual reflexivity upon their ideological, cultural and other idiosyncratic characteristics. In response to this irrepressible expansion and to the densification of the sphere of knowledge, traditional answers have been based on erudition (i. e., reading as much books as possible), specialization (identifying one’s field of expertise) and sampling (finding significant occurrences to explain a phenomenon instead of dealing with all elements). But the number of publications becomes such that reading everything, even in a narrow domain of study, becomes almost impossible, while the continuous specialization results in the fragmentation of disciplinary communities into smaller and smaller groups. Sampling, in turn, has led over years to the reification of canons, and even to a culture of ‘cherry-picking’ when it comes to the administration of the proof. Digital humanities are an attempt to go beyond these limits, or even to escape the fallacy of these responses, so as to build new forms of dealing with complexity that modern day humanities so cruelly need.³²

Turning towards an example to illustrate both this need and the ways the digital humanities meet it, let us start by remembering that, for decades now, it has been repeatedly observed that the circulation of literature, arts and ideas is too much studied from the perspective of the most known and publicized figures, to the detriment of ‘minor’ figures. Thus, the profound transformation of plastic, musical, pictorial, architectural, performative and literary arts during the first half of the 20th century, in Europe as well as in Americas, is almost exclusively related to the activities and proposals of some leading figures, such as, in the Hispanic case, Antonio Gaudí, Santiago Rusiñol, Pablo Picasso, Joan Miró, Salvador Dalí, Ramón Gómez de la Serna, Manuel de Falla, Federico García Lorca or Margarita Xirgu, almost

²⁸ Very different types of researchers exist in the Digital Humanities, when looking at their disciplinary background and centres of interest. There are literary and historical digital humanities, digital humanities rooted in cultural studies and other stemming from sociology, geography, law, and many other fields.

²⁹ Pierre Mounier, ‘Une “utopie politique” pour les humanités numériques?’ *Socio* 4 (2015); available at <https://doi.org/10.4000/socio.1451> [accessed 15 September 2020].

³⁰ Willard McCarty, *Humanities Computing* (Basingstoke: Palgrave MacMillan, 2005), 119.

³¹ About the ‘exigence of totalisation’ that inspires the digital humanities, see Fabien Granjon and Christophe Magis, ‘Critique et humanités numériques. Pour une approche matérialiste de l’immatériel’, *Variations* 19 (2016), <https://doi.org/10.4000/variations.748> [accessed 15 September 2020]. Some of the other phenomena discussed above (the distancing from academia, the importance of Open Access for the Digital Humanities) are also noted by the authors of this article.

³² In a nutshell, see paragraph 16 of the *Digital Humanities Manifesto* by Jeffrey Schnapp, Peter Lunenfeld and Todd Presner (Los Angeles: UCLA, 2008), available at <http://manifesto.humanities.ucla.edu/2008/12/15/digital-humanitiesmanifesto/> [accessed 15 September 2020].

entirely forgetting those who surrounded these stars (close friends, wives, husbands, biographers, etc.) in the convulsive context of Spain and, to a larger extent, Europe during this period. Often constrained to the exile, they played a central role in the large diffusion of the modernist and vanguard ideas. However, information about these ‘second fiddles’ gets constantly side-lined and a partial view on the phenomenon is perpetuated.

Digital humanities invite to go against this trend, and offer the methodological and even the epistemic equipment it calls for. Instead of focusing on a handful of materials, they invite to engage with full sets of documents and archives, even if these are often unsung, and in many cases, difficult to locate when not irremediably lost. Most certainly, such an invitation raises numerous practical and ideological challenges. On the one hand, one cannot minimize the difficulty to extract and then to cope with the mass of information that such an inclusion necessarily involves, even in a digital approach. On the other hand, the treatment these resources get in the digital sphere – beyond the digitization process transforming paper and pictures into pdfs and jpegs, that has been more or less understood and accepted – is undisputedly unsettling. As much as the pretence of analysing ten thousand novels,³³ the idea of looking at all the traces produced by second rank figures goes against one of the most cherished principles of literary studies, that **recommend** personal engagement with documents – an impossible task nowadays, when considering their mass. In addition, computer ‘reading’ can be seen as impoverishing, with unique documents and (sometime life changers) novels, plays, poems, etc. transformed into ‘bags of words’ or, more intelligently, in long concordance lists and metadata. Still, this leap from texts to data appears impossible to avoid if we are to move from the focus on a limited number of exceptional individuals towards a more holistic understanding about the apparition and then the adoption of innovative artistic currents or trends.

This is not to say that studies based on a qualitative analysis of a handful of examples will become impossible, or that all research will become digital perforce (and this very article, or at least this first part, is a living proof of that, insofar it takes no advantage from corpora or digital technologies to build its arguments). However, building the larger picture will ask more and more for a capacity of handling large amounts of texts and information that only the computer can offer. Instead of trying to sew together piecemeal knowledge produced by specialists, or rather in complement to this delicate operation, the aim is to try and offer a solution for embracing the whole with a unified gaze.

Nor does this mean that personal erudition is not to be gained or respected, or that the computer, or rather digital sources of information, can dispense us from engaging personally with texts and artifacts. Quite interestingly, scholars on classical texts or remote periods, in other words, those working in fields where the erudite model is most necessary and pervasive, because of the accumulation of existing scholarship, embraced quite willingly the digital humanities.³⁴ Resistance to Digital Humanities seems, on the contrary, to be more prevalent in the fields where the philological drive is less present, maybe because, as Witmore puts it, ‘it gets at the heart of our continued anxieties about the modernist divide and the perceived dignity of human experience as a pathway to knowledge.’³⁵ Following the same line of thought, one may plead that this perceived ‘treason’ by digital humanists is actually the sign of a necessary evolution of all disciplines beyond the traditional divide between the ‘two cultures’ of scientific

³³ A pretence informing the seminal Franco Moretti’s book *Distant Reading* (New York: Verso, 2013), and still alive in many projects conducted at the Stanford Literary Lab, available at <https://lilab.stanford.edu/> [accessed 16 September 2020]. See also Mark Algee-Hewitt, Erik Fredner and Hannah Walser, ‘The Novel as Data’, in *The Cambridge Companion to the Novel*, ed. Eric Bulson (Cambridge: Cambridge University Press, 2018), 189-216.

³⁴ To give but an example, Willard McCarty, one of the most respected thinkers and practitioners of digital humanities, studies Ovid’s poetry and other classical texts.

³⁵ Michael Witmore, ‘Latour, the Digital Humanities, and the Divided Kingdom of Knowledge’, *New Literary History* 47.2-3 (2016): 353-75; available at <https://doi.org/10.1353/nlh.2016.0018> [accessed 16 September 2020].

vs. humanistic inquiry. Following Latour,³⁶ Witmore observes that the objects we need to study are not purely humanly made, nor entirely naturally given, asking researchers to be able to combine the more scientific fact-finding approach with the reflexivity, contextualization and historicization that characterize more often the humanities. This “compositional” drive is felt on both sides of academia, and while humanists open up to the digital, scientists express in turn an accrued interest for the topics of the humanists, in spite of being sometimes received with mistrust, little understanding or even contempt.³⁷ Far from being a re-enactment of the ‘scientolatry’, whose pervasive effects have been already felt in the humanities in the 1970’s and 1980’s, during – albeit not in strict relation to – the flourishing decades of structuralism, digital humanities appear thus as a new attempt to build a meaningful dialogue between fields that the erudite-specialization-sampling model has put widely apart.

Humanities as Data Science

Beyond the enumeration of these symptoms of dissatisfaction with traditional humanities research manifested in the sphere of digital humanities, it is time now to take a closer look at how they are affecting the actual research processes as a consequence of their desire to take some distance with the established protocols and to deal with complexity in new ways. The answer to such a question is not easy, because of the already mentioned sheer diversity of disciplines and objects of study, covered by both the digital and the non-digital humanities. However, on the basis of our experience, grounded in text analysis and literary history, we may pose that digital humanities affect all the major steps through which a researcher creates new knowledge.

Simplifying outrageously for the sake of the argument, one may say that a research process goes from an idea (an intuition, a curiosity...), to the publication of the findings, passing in a more or less linear way through phases of material gathering, analysis, and paper writing. For reasons of space, we will leave aside the last two steps (paper writing and publication), on which we have already made some observations, and about which one can read illuminating contributions in a recent book edited by Jennifer Edmond.³⁸ As a preliminary, it is important to underline that the differences we address in what follows are not always to be found in all digital researches, and that these often include several non-digital methods and techniques alongside specific practices we describe.

Out of the three ‘traditional’ responses to the complexity above-mentioned, digital humanities seem to concentrate first and foremost on the transformation of the sampling procedure at the core of humanities research, strongly affecting thus the material gathering phase. As opposed to the identification of main ideas, expressions, structures of a text, on which ‘close reading’ rests, digital humanities proceed to the creation of data. The process is far from being straightforward, considering the competing views and definitions about what is data in a document, especially in the literary analysis field with which we are more familiar. Situated at various levels,³⁹ they pose multiple problems of identification, tagging and articulation, that best

³⁶ Bruno Latour, ‘An Attempt at a “Compositionist Manifesto”’, *New Literary History* 41.3 (2010): 471-90; available at <http://www.bruno-latour.fr/sites/default/files/120-NLH-finalpdf.pdf> [accessed 16 September 2020].

³⁷ See the reactions to the call for participation in the DAHLIA research group, posted on the 17th of May 2020 by Claudia Marinica on the francophone list Digital Humanities; available at <https://groupes.renater.fr/sympa/arc/dh/2019-05/msg00041.html> [accessed 16 September 2020].

³⁸ Jennifer Edmond (ed.), *Digital Technology and the Practices of Humanities Research* (Cambridge: Open Book Publishers, 2020), available at <https://doi.org/10.11647/OBP.0192> [accessed 16 September 2020].

³⁹ Without entering into too much detail, let us remind our readers here that data can be attached to a whole document (and in this case the convention is to talk about ‘metadata’), or to a specific string of characters in the document; it can concern structural or lexical elements; individual words, syllables or

practices and recommendations, such as TEI or Dublin-Core, do not entirely solve. In spite of these limitations, the interest of a data approach is the call to a systematic, uniform and complete treatment of the sources,⁴⁰ with no preconceived idea about what is to be found in these and no premature filtering out of elements that do not fit a more or less articulated interpretative scheme. From a traditional humanistic perspective, such an approach raises multiple questions, related to the added value of such an enterprise. We will endeavour to answer these concerns in turn.

In the case study described here, the creation of data started with the digitization of all manuscripts, letters, images, pictures, sounds and movies produced by ‘satellites’.⁴¹ In a second step, metadata have been attached to all documents, and a great amount of work has been put into a rich description of the supports, formats, relationships and contents, going largely beyond the recommendations for minimal metadata sets, aimed mainly at facilitating the harvesting of the resources by internet crawlers. Such an effort can be judged disproportionate, considering the time it consumed as opposed to the little interpretative results it yielded (as yet). This would be to forget that the metadata thus created can serve not only to the scholar or the project that produced them, at a specific point in time, but to future researches, conducted by the project owners or by their peers. To the difference to the manual gathering of material in a ‘traditional’ research project, one of the main values of data produced in a digital humanities approach is thus its reusability. Therefore, new forms of collaboration are stimulated and a faster engagement with sources becomes possible.

Another reason of defiance towards the process of data creation seems to be related to the very ambivalent position of humanities scholars towards exhaustivity. On the one hand, there is a claim, more implicitly than explicitly made towards peers and early career researchers, to be exhaustive in their bibliography, whether this is to be understood as covering research undertaken by others on the same topic, or primary sources that the research is supposed to exploit, or both. On the other hand, when it comes to the contents themselves, the exhaustivity does not seem to be as important to humanists as a clever analysis of some elements and case studies. The processes for acquiring and curating large (or even full) datasets may appear therefore as a solution for an inexistent demand, and even more as a nuisance since it mobilizes time and intelligence for dealing with what may be finally judged as a lot of uninteresting occurrences. Digital Humanists interrogate, in turn, the validity of a discourse of knowledge based on a handful of examples, over-interpreted or poorly projected on a whole dataset. Exhaustive data allow cross-checking and support refutability, a Popperian principle to which digital humanists, closer in this respect to the ‘hard sciences’, are profoundly attached. In other words, creating exhaustive data is accepting to be more completely exposed to the criticism of the peers, and to pay the psychological and cognitive costs that such a criticism entails. If the story of the research in the humanities is, at least partially, one of a slow distancing from the

even characters or phonemes can be data, or, on the contrary, long spans of texts can be isolated and defined as such.

⁴⁰ To give but one example, if it has been decided that sentences form a type of data in a text, then all sentences must be marked up, or at least one must have a clear indication about the types of sentences that are marked up and the ones left aside.

⁴¹ We call ‘satellites’ all the less-known figures of the Hispanic vanguard mentioned above. By digitization, we mean here the mere action of producing a digital equivalent of the initial document. For more information about the whole process, see the ‘About’ pages concerning each author, for example <https://guarnido.nakalona.fr/about>, <https://molina.nakalona.fr/about>, <https://ainsa.nakalona.fr/about> [accessed 16 September 2020], as well as Cécile Brailon-Chantraine, André Davignon, Nicolas Lahoche, Fatiha Idmhand, Cécile Martini, ‘Le programme de recherche sur les archives du Fonds Alcides Giraldis: un exemple de production de données en humanités numériques’, *Revue des Nouvelles Technologies de l’Information*, Hermann, special issue ‘Fouille de Données et Humanités Numériques’ (2014): 169-84 ; available at <https://halshs.archives-ouvertes.fr/halshs-01132614>. [accessed 16 September 2020]. All corpora are freely accessible on NAKALA, a French infrastructure provided by HumaNum; available at <https://www.nakala.fr/> [accessed 16 September 2020].

authority principle, or rather one of a change in what makes authority,⁴² it can be derived that digital humanities are indeed helping to push forward the work of the humanities.

A frequent reproach made to data creation in humanistic **discipline** is that it impoverishes texts. In the process of identifying all occurrences of a phenomenon, the overall sense gets supposedly lost for the sake of a delusional ‘objectivity’. This is to ignore to what extent, at every step, digital humanists are aware that data creation involves interpretation, and therefore a form of ‘text enrichment’. As Johanna Drucker has put it, ‘data are capta’,⁴³ and, as such, they involve subjectivity, or even hidden assumptions and personal agendas. In a different context, the authors of the reports produced within the K-Plex project observe that ‘in fact, “big data” approaches are highly selective’.⁴⁴ This in turn exposes digital humanists to the reproach of objectifying partial views. Interestingly, similar concerns are seldom voiced about traditional research in literature, in spite of longstanding practices in the field of filtering, diminishing and discarding information about less known books, authors and journals. The real difference is that digital humanities projects, such as ‘Satellites’, have built-in mechanisms for recording all these filtering operations, allowing future scholars to reconstitute at will the continents lost. It may well be that the mistrust with which they are faced translates in some cases the uneasiness of non-digital processes of being held to similar transparency standards.

Moving from data creation to data analysis – or, in other terms, from the material gathering to the interpretation step – another important change brought by digital humanities to the research process is the complete upheaval it can produce in this more or less linear movement because of the possibility to approach the objects of study with no preliminary hypothesis or articulated aim. As Geoffrey Rockwell puts it, the starting point of a digital research is sometimes ‘free floating stuff. That stuff wasn’t driven by research questions though. It was more solutions looking for a problem. There were these interesting text analysis methodologies and techniques, impressive statistical approaches to stylometry, etc., that just made my fingers tingle to get hands-on and to apply them to concrete problems. A friend of mine called this “haptic thinking”, a way of developing thoughts and new insights through using your keyboard.’⁴⁵ As it has been repeatedly observed, digital humanities research may develop from playing with datasets and testing various lines on inquiry on them, whether these lines of inquiry relate to a genuine, pre-existent interest of the researcher, or are completely made up as a part of a training program.⁴⁶

This kind of ‘haptic thinking’ is not new in several disciplines (linguistics, sociology, geography, etc.), where data gathering is also a well-established practice, and in these fields the digital turn brought mainly speed, breadth and accuracy. Other disciplines opening to the digital, such as literary analysis, come slower to such an approach. In the ‘Satellites’ project, haptic thinking has been adopted once working with metadata from a traditional perspective proved insufficient. Indeed, in a first step, metadata has been understood and exploited following Genette’s proposal in his famous works, *Palimpsestes* and *Seuils*⁴⁷; since it includes titles, subtitles, authors’ names and numerous other generic indications that guide the reception of the resource and its ‘consumption’, while defining its ‘presence in the world’⁴⁸, metadata can be

⁴² In this respect, see the description of the evolution from prescriptivism to descriptivism in Rens Bod, *A New History of the Humanities* (Oxford: Oxford University Press, 2013).

⁴³ Johanna Drucker, ‘Humanities Approaches to Graphical Display’, *Digital Humanities Quarterly* 5.1 (2015); available at <http://www.digitalhumanities.org/dhq/vol/5/1/000091/000091.html> [accessed 16 September 2020].

⁴⁴ <https://kplex-project.com/> [last accessed 16 September 2020].

⁴⁵ Geoffrey Rockwell, ‘What Is Text Analysis, Really?’, *Literary and Linguistic Computing* 18.2 (2003): 209–19, available at <https://doi.org/10.1093/lc/18.2.209> [accessed 16 September 2020].

⁴⁶ See a reflection upon such an approach in Neil Fraistat ‘Data First: Remodeling the Digital Humanities Center’, in *Debates in the Digital Humanities 2019*, eds Gold and Klein.

⁴⁷ Genette Gérard, *Palimpsestes* (Paris: Seuil, 1982).

⁴⁸ Genette Gérard, *Seuils* (Paris: Seuil, 1987).

seen as embodying in the digital sphere the editorial paratext.⁴⁹ As such, it acts in similar ways as a ‘threshold’, an ‘indecisive’ zone between the inside and the outside of the book – here, of the digital object. It can, therefore, be used for the same purposes as the perusal of a paratext, mainly for the preparation of the text analysis. In the same way as the print medium, but faster thanks to digital interrogation protocols, consideration of dates helps to avoid misunderstandings and anachronisms, potential summaries give a general understanding on what the text is about, a presentation of the author’s background helps to connect **its** themes with a context or an artistic trend, and so on. Thus, a distant reading of the dates associated to documents related to José Mora Guarnido, Carlos Denis Molina or Fernando Aínsa’s **facilitate** the identification of their most creative writing periods; an interrogation by type of document allows to rapidly group together press articles, essays or correspondences, while a search by subjects and keywords facilitates crossing themes. To some extent, metadata creation and analyses **corresponds** therefore to the traditional practices of sampling and to the identification of the themes needed for a demonstration.

However, beyond these uses the very existence of rich metadata in the fluid electronic format allows to adopt a more playful stance, and to provoke serendipity. In the ‘Satellites’ project, haptic thinking led to the application of algorithms of recommendation, developed with very different purposes in mind, to a portion of the metadata created during the digitization process.

Since 1990’s, recommendation has become one of the most frequent application of machine-learning methods, either supervised, unsupervised or based on reinforcing procedures.⁵⁰ Based on the so-called ‘filtering algorithms’ to create predictions either from common points identified in the past so as to predict a ‘future’⁵¹ or from assumed similarities to suggest possibilities,⁵² it is the most widely used form of artificial intelligence in various fields of knowledge or practical activities. From recommendations of movies to watch, to the suggestions of products to buy or of personalized online radio, many websites and devices run machine-learning algorithms at the heart of their systems. The same ones intervene to produce reliable predictions and decisions on new data, or to discover relationships and implicit knowledge from existing data, in biology and tribology, economics, social studies, and so on. However, recommendation as a way to explore large volumes of data has not been experimented with in literary studies, which seem by nature too far from the applicative domains of this form of computer studies. As it turned out, recommendation can however help to identify new associations, patterns or unknown relations between one or more authors in a quicker, more efficient and productive ways than the traditional reading and sampling approaches.

Three authors’ archives were selected, each one containing about 1700 documents described with 30 to 40 metadata fields, for a total amount of some 50.000 information points. In a first step, a ‘gradient boosting algorithm’ was trained on the basis of two thirds of the documents and two metadata fields, namely ‘state of the documents’ (with three possible values:

⁴⁹ Lots of recent works speak about the paratext **in digital** sphere. Amongst others, see Gavin Stewart, ‘The Paratexts of *Inanimate Alice*: Thresholds, Genre Expectations and Status’, *Convergence* 16 (2010): 57-74; or Nadine Desrochers and Daniel Apollon, *Examining Paratextual Theory and its Applications in Digital Culture* (Hershey, Pennsylvania: IGI Global, 2014).

⁵⁰ For an overview of its applications, see Dietmar Jannach, Markus Zanker, Alexander Felfernig and Gerhard Friedrich (eds.), *Recommender Systems – An Introduction* (Cambridge: Cambridge University Press, 2010). For an overview of the most recent trends, see Meen Chul Kim and Chaomei Chen, ‘A Scientometric Review of Emerging Trends and New Developments in Recommendation Systems’, *Scientometrics* 104 (2015): 239-63; available at <https://doi.org/10.1007/s11192-015-1595-5> [accessed 16 September 2020].

⁵¹ The ‘content-based filtering’ algorithms plot user’s ‘clicks’ to recommend other data he or she is likely to have an interest to.

⁵² The ‘collaborative filtering’ algorithms are based on the identification of similarities between users (i. e., a common interest in a type of contents), so that the objects viewed by the first can be recommended to the second user and vice-versa.

‘good’, ‘medium’ and ‘bad’), and ‘document language(s)’ (‘Spanish’, ‘English’, ‘French’, ‘Portuguese’). When asked to make predictions on the test corpus, the machine guessed right with an accuracy of about 87%, that has been judged correct enough for pursuing the experiment.

A tool called ‘Link&Pred’ has been developed to model the authors as nodes, and the links between them as parameterized edges with a weight that represents the degree of commonality between them. As input, the (curated) data were presented in a CSV file. Inside the system, they were converted into a graph file through calculations that took into consideration the life and creative periods of the authors (in other words, the periods during which they could have collaborated), the keywords attached to the documents they produced, or linked to them, and the subjects they shared. On this basis, the system was asked to predict their potential relationships, understood here as intellectual proximity or similarity.⁵³ Different link prediction algorithms were analysed and tested (Common Neighbours, Adamic Adar, Preferential attachment, Resource Allocation, etc.) until finding the algorithms with the highest results (92 to 97% with SimRank and CommonNeighbors). We obtained then a visualization showing pairs of authors as nodes on the graph, whose relationship is established as follows: the higher the score (greater than 1.0), the greater the possibility of an intellectual link between these two authors. As expected, evident relations emerged clearly between known authors belonging to the same school of thought, but other, unexpected links were brought to the fore, such as those identified in Fernando Aínsa’s correspondence.⁵⁴

From 1974 to 1999, Aínsa has been the director for literary publishing at UNESCO. This prestigious position put him in contact with numerous outstanding figures in publishing industries, as well as in the cultural and literary sectors; it also enabled him to help disseminating Latin-American literature on both sides of the ocean. A ‘traditional’ approach to his correspondence involves a chronological reading of his letters, looking at each text so as to identify networks, shared passions and themes; discovery takes time and, in many cases, a great deal of luck. Link&Pred allows to go much faster, and in some way in a surer way, insofar it observes regularities and points towards several interesting letters. Thus, through analysing metadata of 1835 letters written from 1972 to 1988, the tool puts to the fore the links between Fernando Aínsa and Julio and Iris Ricci, on the one side, Fernando Aínsa and the New Yorker translator and academic Clark M. Zlotchew, on the other side – but also, more unexpectedly, between the Ricci and Zlotchew. A return to the texts showed, indeed, that the Ricci and Zlotchew met in New York, became friends, and that this friendship is the key facilitator in the diffusion in the USA of two works by Fernando Aínsa, *Con acento extranjero* and *Las palomas de Rodrigo*. Other similar suggestions may help to draw a larger picture of the networks who contributed to the penetration of Aínsa’s ideas and works in the North-American academic circles, and to analyse the chronology of his growing influence.

Beyond doubt, the research process cannot stop at the identification of such links and potential similarities. Recommendation algorithms make suggestions, but do not pretend to replace analytical work. Without contextualization, masses of data have very little value and recommendations are unusable, or can even become dangerous, by locking the researcher in a specific theme or way of thinking, without the possibility of opening up to other perspectives. But understanding machine possibilities and opening up to methods developed in computer science allow to engage in more complete ways with our objects of study. Far from pretending to offer blue-prints for research and maps to discovery, digital humanities remain thus profoundly humanistic in their attachment to a serendipity principle, that machines may boost, but not replace.

⁵³ The prediction system described here has been developed by Laifa Ghani as part of his internship during spring 2019 within the Institut des Textes et Manuscrits Modernes (Paris, UMR8132, Archivos team). The system is actually in the process of being further improved.

⁵⁴ See <https://ainsa.nakalona.fr/> [accessed 16 September 2020].

Conclusions

Digital Humanities may be sometimes synonymous to an excess of technologisation. There is a rush towards new techniques, new software, rather than taking the time to fully exploit the ones we have in hand. Another identifiable trend is that of creating digital artefacts for the sake of digital artefacts – databases and digital editions whose intellectual exploitation is perpetually postponed, or that are minimally exploited. Also, having a clear understanding about what a visualization can say, or building an inspirational interpretation on the basis of the results of a program, is still work in process, at least in literary studies. But this is less a fault of digital humanities themselves, and rather the continuation in a digital paradigm of older reflexes in academia, such as the complacency in text perusal, description and paraphrase instead of building new knowledge and seeking for wisdom.

So far, the digital humanities do not fulfil their potential, for a whole range of reasons. To start with, they remain characterized by a form of fragility, both of their inputs and of their outputs: digital data is menaced by all types of obsolescence, of the materials, of the file types, of the contents, and so on. Data creation proves to be an unfinished, perpetually incomplete endeavour (as opposed to the ‘final product’ standard that goes with book publishing), and a culture of the ‘perpetual prototype’ characterizes most of the products, especially but not only in digital scholarly editing;⁵⁵ subsequently, the papers we produce are more often reports about newer or older projects, links towards milestones, rather than ‘definitive’ words on a matter. A particular handicap created by the culture of data handling is the dependency on storage facilities, interfaces and tool maintenance. The ecosystem of scholarly validation, on which digital humanities are even more dependent than their non-digital counterpart, for the reasons shown above, is still in the process of strengthening. But these drawbacks do not overshadow the advances the digital brings to the humanities, whether **in terms respecting** their fundamental principles or when it comes to the results obtained.

A last aspect in which digital humanities may be said to depart radically from the disciplines they are stemming from may be their refusal to fully adhere to the long-told story of the modern ‘decay’ of the university. From a Digital Humanities point of view, it is all too easy to pretend that pre-digital, pre-neo-liberal university was a paradise in which critical thinking and solid scholarship were the sole goals of academia. In the name of reflexivity, how many proceedings gathering papers vaguely related to a theme, where authors take a key word as a motive for accumulating quotations that lead to nothing? In the name of historicization, how much bibliographic showing off? The interference of various agendas with the research of the truth is not new, and if one could get back in time it would be difficult to decide in what era precisely one should regress in order to live in a world closer to academic ideal(s). A factual comparison of students’ trajectories may well show that a doctoral candidate benefits from a much fairer treatment in 2020 than in 1960 or 1970. If success and employment in research fields were higher in the middle of the 20th century, this may very well have much more to do with the limited numbers and elitist characteristics of doctoral studies of the time, than with the structure of the academic system of the era. Rather than deploring a paradise lost and turning solely towards external menaces to the academia (whose existence is most certainly not to be denied), digital humanities remain characterized by a ‘critical self-consciousness’⁵⁶ and are looking to improve the situation by upsetting the apple cart in our own humanities shop. And they do so deliberately – not because they are fanatical technology-mongers, barbaric or snob, but because they are humanistic.

⁵⁵ See Elena Pierazzo, ‘A Rationale of Digital Documentary Editions’, *Literary and Linguistic Computing* 26.4 (2011): 463-77; available at <https://doi.org/10.1093/lc/fqr033> [accessed 16 September].

⁵⁶ Joanna Drucker and Bethany Nowviskie, ‘Speculative Computing: Aesthetic Provocations in Humanities Computing’, in *Companion to Digital Humanities*, eds Susan Schreibman, Ray Siemens, and John Unsworth (Oxford: Blackwell, 2004), 431-47.

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**De la text la date,
sau
Umanitățile numerice drept critică a cercetării în științele umaniste**

Umanitățile numerice (sau digitale) sunt acuzate pentru contribuția la decadența standardelor academice, și pentru trădarea principiilor umaniste. Scopul acestui articol este să combată aceste acuzații. Prin analiza evoluțiilor pe care le-au cunoscut umanitățile digitale, precum și a principiilor și a practicilor care pot fi observate în acest câmp de cercetare, încercăm să arătăm că dezbaterile pasionate care continuă în legătură cu umanitățile numerice sunt legate de poziția critică pe care o iau cu privire la cercetarea „tradițională” în științele umaniste și sociale. În prima parte a articolului, vom vorbi despre principiile colaborative și FAIR care caracterizează umanitățile digitale, pentru a arăta că aceste principii și practici exprimă o formă de insatisfacție față de organizarea umanităților și față de practicile curente în acest domeniu. A doua parte este bazată pe un exemplu concret de explorare a unor documente de arhivă produse de câțiva membri ai avangardei hispanice din secolul XX. Obiectivul celei de-a doua părți este să arate în mod concret care sunt problemele și dificultățile legate de lucrul cu date numerice, precum și adoptarea unei gândiri haptice în domeniul literar și cultural.