The Epistemic Cultures of the Digital Humanities and Their Relation to Open Science: Contributions to the Open Humanities Discourse

Beatriz Barrocas Ferreira[1]**, Maria Manuel Borges**[2]

Abstract

The epistemic cultures approach exposes the different ways knowledge production channels are built up among the various fields of study. In revealing these differences, the fragmentation of science can be clearly seen. Digital humanities is one such field. It is an inter- and transdisciplinary field, composed of diverse epistemic cultures and marked by distinct knowledge production practices. In the current landscape of scholarly communication, namely the open science paradigm, open practices have been at the forefront of conversation and research. The discourse's true focus, however, is more along the lines of the epistemic cultures of the hard sciences, meaning that it does not fully consider other domains of knowledge. Thus, through a literature review, this study aims to frame the digital humanities' epistemic cultures in the discourse of open science. The conclusion is, a conversation needs to be had specifically about the openness of knowledge, also considering other epistemic cultures' diversity of scholarly communication practices. This would include the humanities. While simultaneously opening up this discourse, it is considered that digital humanities can also contribute to its consolidation.

Keywords: Epistemic cultures, open science, open humanities, digital humanities

Introduction

Research processes in the humanities are not fundamentally digital, unlike those in the hard sciences. The discourse around Open Science (OS), inspired by the latter, does not effectively represent the heterogeneity of epistemic cultures, especially within the humanities (Knöchelmann, 2019). Even with the development of Digital Humanities (DH), which is considered to be a field rooted in digital technology with several disciplinary limits, the application, in these cultures, of open and transparent practices during research and scientific communication is not always coherent or executable. This instability of the application is very much due to the ongoing discussion about OS and the hard sciences. This is even more evident as the humanities, by themselves, aggregate a wide range of fields each with its own epistemic culture divergent from the other. In other words, the hard sciences have heavily impacted the talk about OS, ignoring the diversity of epistemic cultures of research and, consequently, their heterogeneous practices, ultimately maintaining a narrow vision of research.

It is, in this sense, that Knöchelmann (2019) warns of the need for discussion dedicated to open humanities, which articulates the entire dimension of humanities cultures, including their interests, methods and practices, and their technological dimensions. This would then enable the adaptation of processes from OS to the humanities. It is, therefore, necessary to have a single voice and a consolidated vision that can unite all the humanities disciplines, fusing them into one coherent nucleus regarding opening research. It is expected that this discourse will help us understand the measures of the social and the technological in this culture, to include all its particulars within the research system – that is, to serve as a consolidation of open practices in the area

[1,2] University of Coimbra, Centre of 20th Century Interdisciplinary Studies, Faculty of Arts and Humanities, Coimbra, Portugal; bferreira@student.fl.uc.pt

nd, at the same time, to call attention to the adaptation of certain characteristics by academic institutions and funding agencies in research policies for the humanities.

Still, there seems to be a paradoxical situation here, in which there is increasing talk on the openness of scientific research throughout the various knowledge domains, while no adoption of OS principles into the humanities actually occurs. Is it because the conversation is geared towards the hard sciences more than the humanities? Or, is it because different knowledge construction practices are used in the humanities that are not related to those of OS? To what extent does OS fit into the humanities culture? Given the multidimensionality of the scientific communication system and the different existing epistemic cultures, does OS's "one size fits all" approach meet the needs felt in the humanities? Can DH contribute to the construction of synergies between humanities and OS, or will it rather contribute to the discourse of open humanities?

Based on the studies by Knorr-Cetina (1991; 1999; 2007) – which affirm the fragmentation of science – regarding the approach of epistemic cultures (how scientific knowledge is produced, and how culture is infused into the practices used in knowledge production environments) we seek to study how understanding the epistemic cultures of DH can contribute to the implementation of OS principles in the humanities. First, we will look at the area of DH as epistemic cultures. We will see how it relates to the OS discourse. Moreover, we will try to demonstrate, through the talk about open humanities, that it (DH) does not consider certain characteristics of the humanities. We will conclude with a dedicated discourse on the opening of scholarly communication practices necessary in the humanities. In this sense, the objective is to explore how DH can add to the conversation about open humanities.

This paper is structured so that the concept of epistemic cultures and the disunity of research fields that such an approach implies is presented first. This is followed by the contextualization of communication practices adopted in the humanities and in the DH. This paper is concluded with a detailed treatise for a discourse on the openness of knowledge involving different epistemic cultures present in the scholarly communication system. This call would be made by detailing the predominant discourse already active in the special literature – open science – and the framing of the discourse dedicated to open humanities.

Research design and Methods

The main goal of this work is to reflect on the inclusion of DH's epistemic culture in the OS discourse. As specific goals, it is proposed to: (i) describe the concept of epistemic culture, particularly DH scholarly communication practices, (ii) identify the approaches adopted by OS and relate them to those of DH, and (iii) demonstrate the need for the existence of a speech dedicated to the opening of the humanities and to prove that DH contributes to the same.

An exploratory qualitative approach was adopted, by conducting a literature review aiming to contextualize the approach of epistemic cultures, particularly about DH and its relationship with OS. Therefore, three basic topics of the present work stand out – epistemic cultures, Digital Humanities, and Open Science – which served as a guide for information retrieval.

The Scopus and Web of Science (WoS) databases were used, considering that they were able to provide broad and relevant cartography of the scientific literature; and, also, the collective catalog of the libraries of the University of Coimbra, to gather reference monographs in the area of study, particularly on epistemic cultures.

For the information retrieval in Scopus and WoS, the terms «open science», «digital humanities», «epistemic cultures», «open humanities», «scholarship» and «scholarly communication» were applied, making use of research strategies, through the application of advanced subject searches, in English, using Boolean operators, quotation marks and proximity operators. In the library catalog, searches were implemented by author and by subject, using the previously mentioned descriptors, in Portuguese.

Regarding the evaluation and selection of results, the titles, keywords, and abstracts presented by the databases and their relevance were considered. At the same time, duplicate results were also detected, retrieved in previous searches. For the organization and management of the bibliography, the Zotero software was utilized.

As for the analysis and interpretation of results, the literature review was carried out at two levels. First, the sought for articles were selected from the chosen databases. Furthermore, an analysis of article relevance was carried out by reading the titles, abstracts, and keywords presented in them. This analysis made it possible to reduce the results, recovering only the most relevant data that integrated the requirements previously defined for their retrieval, namely in terms of content. In the second phase, the in-depth reading of the works and their bibliographies expanded to a set of articles, not included in the results from the databases. These 'extra' articles were later selected and retrieved for inclusion in the present study.

Results

The epistemic cultures approach

The notion of epistemic culture is introduced by Karin Knorr-Cetina in her ethnographic studies on high energy physics and molecular biology, where she presents the contrast between scientific domains, and exposes differences in the process of production and creation of knowledge. Epistemic cultures aim to capture the internalized processes of apprehension, referring to the set of practices, compositions, and mechanisms that, together, in each area of knowledge, produce and put into practice the known modes of comprehension (Knorr-Cetina, 2007). For the author, culture refers to the aggregation of patterns and dynamics displayed in specialized practice, in varying configurations (Knorr-Cetina, 1999). That is why the author suggests the term "epistemic culture" instead of just "knowledge culture" since upon considering previous scientific research and analyzing the machinery of knowledge she chose to concern herself with creating and guaranteeing the same (Knorr-Cetina, 1999; 2007). While seeking to preserve the aforementioned practices, this approach seeks to use epistemic cultures as a replacement for the notions of discipline and expertise.

Consequently, this approach, focusing on the mechanisms of creating knowledge, presupposes the disunity and fragmentation of science. This fragmentation idea sprung from considering the nuclei that make up epistemic cultures of science, and from exposing the different structures of empirical approaches, of specific referent constructions, particular instrument ontologies, and various social machines (Knorr-Cetina, 1991; 1999; 2007). In other words, the vision of a homogeneous science does not correspond to reality, and each epistemic culture adopts its process and its practices, distinguishing itself in the methods, concepts, and forms of argument that reveal a diversity of research styles and epistemological features. "Science" is therefore radically disunified, consisting of different practices and epistemic structures located in different spaces of knowledge (Malazita et al., 2020).

Knorr-Cetina (2007) proposes that to identify epistemic cultures, one must first know the entities that comprise them, asking, what epistemic issues they address, and who the agents and objects of knowledge involved in scientific practice are. In the study of epistemic cultures, research on the relationship between objects of knowledge and their approach/study strategies is quite relevant. This is in line with what Becher and Trowler (2001) show regarding the existence of several academic tribes, each with its own identity and ideology, defending and defining its intellectual territory.

Each academic tribe differs in structure, being constituted by cultural elements that encompass their traditions and beliefs, customs and conduct, practices, knowledge transfer methods, and forms of communication (Becher & Trowler, 2001). The differences between the domains of knowledge are evident in the characteristics of the objects of research; in knowledge growth; in the researcher-knowledge relationship; in research procedures; in the extension of the criteria adopted to reach the "truth"; and in research results (Becher & Trowler, 2001). The same authors also emphasize that the different disciplines are subject to historical and geographical variation, undergoing changes, especially at the local level, maintaining a recognizable continuity regarding their identity, and adopting a vision that the structures of knowledge are mediated by social processes. Thus, different research fields are composed of several elements that establish social relationships for the construction of knowledge. In short, each epistemic culture adopts its own construction of knowledge, integrating different practices and approaches regarding its creation and production that are reflected in its traditions and epistemic elements. This implies different visions, with different results, and, depending on the context, the approach of epistemic cultures reveals localized norms and practices. As Cronin (2003) states, epistemic cultures have their own rules and procedures, particularly regarding scholarly communication, which is revealed as the ultimate goal of any epistemic culture. Regarding scholarly communication practices, although the structure of the traditional system is similar across domains of erudition, the particularities and heterogeneity of different epistemic cultures do not allow for just one approach, since the research and communication process is not uniform (Thorin, 2003). This results, then, in the use of different tools and, consequently, in different communication practices.

From humanities to digital humanities

The humanities are part of a wide range of academic tribes, each with its own tradition and culture. Knöchelmann (2019) states that the characteristics based on which disciplines can be classified in the humanities are perspectivity (as opposed to objectivity in the sciences), verbality (as opposed to reliance on models), and historicity (as opposed to systemic integration), thus reflecting the importance of hermeneutics, source criticism,

and contextual meaning for these epistemic cultures. Considering this, the paradigms and methods used in the humanities contrast the focus on objectivity, reproducibility, and replicability seen in the hard sciences (Arthur & Hearn, 2021). These characteristics distinguish the humanities from other cultures, such as sciences and social sciences, especially when it comes to the recognition of scientific practices and methods by intellectual society.

DH follows an interdisciplinary orientation, reflecting a certain ambiguity regarding its definition (Luhmann & Burghardt, 2022). It can be characterized as a field where several experimental approaches can be grouped to discuss some of the central questions around the humanities, applying computational methods and collaborative methodologies (e.g. data visualization, 3D modeling, digitization, digital libraries). DH thus becomes disruptive, surpassing the habits and traditions of the "traditional" humanities, rooted in the printed medium and with a more individualistic vision regarding the production of knowledge. DH combines several elements of different epistemic cultures, implementing, in a laboratory-like environment, collaborative practices for the wide dissemination of research results into the production of knowledge. For these reasons, it can be said that DH is an approach carried out in the humanities, social sciences, and technology territories, incorporating digital tools in the different phases of their research cycle. The focus is on both the production and analysis of data, digital or digitized (Maryl et al., 2020). Simply put, this data deals with engaging new ways of conducting humanities research through collaborative and transdisciplinary practices in a digital medium.

The introduction of digital technologies into research and scholarly communication influences segments of scientific practice at practically all stages of the scientific process, making them indispensable (Antonijević, 2015). However, considering the diversity of epistemic cultures and their epistemological and methodological specificities, it is natural that the impact that digital tools represent on their scientific practices is different in each field, beyond the time of adoption.

The humanities reveal a more discursive character, allowing a more complex description and narrative (Maryl et al., 2020). Regarding the characteristics of their forms of scholarly communication, the prevailing medium continues to be the monograph and book chapters, which, by itself, take more time to produce and distribute, and also have more costs associated. They also display certain specificities concerning their epistemology, workflow, collaboration, and argumentation, maintaining a close connection with the local context (Cronin, 2003; Giglia, 2019; Knöchelmann, 2019; Maryl et al., 2020). It is, for this reason, their communication is often directed to specific geographic areas and cultural situations, and, therefore, in the native languages of the context in which the research is produced, instead of what is seen in the areas of the hard sciences, in which English is considered the *lingua franca*. With this in mind, the multifaceted nature of the research in the humanities, with multilingualism playing such a relevant role (Balula & Leão, 2021), the main audience of the humanities is much smaller, compared to one of the hard sciences, meaning that the use of English as *lingua franca* imposes some linguistic barriers in spreading the message and developing the research within the humanities epistemic cultures (Arthur & Hearn, 2021).

In the current context of scholarly communication, centered on the OS paradigm, DH has been gaining a prominent role to deal with new methods of digital empowerment in the humanities (Knöchelmann, 2019). Having the same object of study as the humanities, while using relatively different practices, DH is due to the application of digital tools and techniques, collaboration practices, but also to the fact that DH produces, interprets, and analyzes data, taken in the same context as in the hard sciences (Arthur & Hearn, 2021). They reflect a transdisciplinary level of epistemology, including all methods, systems, and heuristic perspectives related to the digital, in the fields of social sciences and humanities, in information as well as computation science (Edmond & Lehmann, 2021).

Still, although with a divergent and disruptive character, with a tendency to adopt innovative digital tools, when it comes to scholarly communication practices, DH tend to be similar to those of the "traditional" humanities (Weel & Praal, 2020). Monographs still weigh heavily in the scholarly communication of the DH (Giglia, 2019; Knöchelmann, 2019). This has to do with the four functions of scholarly publishing – registration, certification, dissemination, and archiving – and the system of scientific evaluation and recognition, both of which are very much rooted in the print paradigm (Weel & Praal, 2020). Still, the adoption of informal channels for the dissemination of research in DH, namely social networks, among other digital platforms, has increased, though not significantly (Weel & Praal, 2020). However, DH may still represent an important actor, in the way to broaden the voice around the opening of research. This implies the adjustment of science policies from funding agencies and the reform of the assessment and evaluation system; and infrastructures that can support the research processes conducted in the humanities, as well as the recognition of more than one way to produce and communicate research. In other words, it points to the need for the deconstruction of the discourse around open science and the realization that research is constituted of several epistemic cultures with different scholarly

practices. Consequently, it means that the efforts made around the openness of research must be adapted and applied differently to each epistemic culture.

Discussion: the epistemic cultures of digital humanities and their relationship with open science

OS is a new vision/model (or a new paradigm) in the practice and communication of science, which drives innovation and scientific creativity based on collaborative, transparent processes that promote accessibility to all stages of the research production cycle, embracing all stakeholders in the scientific system. Although still without a formal definition, Vicente-Saez and Martinez-Fuente (2018, p. 434) propose that OS is *transparent and accessible knowledge that is shared and developed through collaborative networks*. OS is then possible through the introduction of digital technologies in the scientific research scenario and by taking advantage of the opportunities offered by them, by the elements of the scientific system, as well as the change of culture in the academic and scientific environment. This change allowed the consolidation of its principles based on collaboration and cooperation between scientists, the transparency of research processes, and their openness and accessibility. In turn, the application of these principles contributes to new research practices and the dissemination of scientific results and, therefore, to the improvement of the quality and effectiveness of science, speed of dissemination of scientific results, generation of new knowledge, and scientific progress.

It is, in this sense, that the practice of OS is characterized as being democratic, inclusive, transparent, collaborative, responsible, and reproducible (in a way, the classic values of science). Some authors claim that OS is a concept, while others consider it an umbrella term composed of several pillars that support it and that are related to each other. Of these pillars, Abadal (2021) highlights six – Open Access; Open Data; Open Peer Review; Use of Preprints; Citizen Science, and New Assessment Models. Although the importance of each one at an individual level is highlighted, synergy and coordination between all are urgent for the consolidation of OS. The fact that some "pillars" are more developed and implemented than others influence the development of OS and, in turn, science in general. For instance, in DH, with the diversity of research outputs, and since the monograph plays such an important part, institutions implementing traditional metrics, at the level of publication, for assessment, tenure, and promotion, which is still a common practice, jeopardizes this field and their researchers. In this sense, a call is made for the development of sustainable technological tools and infrastructure, or, in other words, open-source – an also fundamental element for OS.

There has been a rapid evolution concerning the initiatives toward the implementation of OS across all sciences, but many of these actions, such as new publishing models or funding mandates, start from the culture of the hard sciences (Watchorn, 2022). By analyzing the definition of OS proposed by several funding bodies, including the European Commission (2014), one must assume that OS presupposes that every research involves the use and creation of data of any kind in every phase of the research process and that it is generated digitally, which in the humanities does not always apply (Watchorn, 2022). Taking these aspects into consideration, Arthur and Hearn (2021) suggest that instead of continuing the discourse on OS, centered on the hard sciences, one should instead raise and pursue the debate around open research, contributing then to the understanding of the dichotomy between both open science and open humanities, thus recognizing the peculiarities of the different epistemic cultures.

In humanities, although the Berlin Declaration on Open Access to Knowledge in the Social Sciences and Humanities (2003), recognized the importance of open access within these epistemic cultures, its transition reveals a smaller percentage compared to hard sciences (Suber, 2017). In addition, the scholarly communication of DH may imply different models of funding, concerning the processing fees for publication in open access, both for articles and monographs (Maryl et al., 2020). A particularity that contributes to a less rapid opening in the humanities is related to the diversity of languages – or multilingualism – used at the time of publication, related, indirectly, or directly, to the evaluation system and scientific recognition, but also the (non) implementation of the culture of preprints in the humanities, and with the peer review processes in these domains. The use of preprints in the humanities is limited, especially because it has a short period of lifespan, given that the monograph is the main meaning of communication (Arthur & Hearn, 2021). This implies the non-consolidation of fundamental principles of OS in the humanities, such as sharing preprints, and the use of open licenses, not because they are not neglected, but because of the way they are presented and suggested that do not consider the particularities of the epistemic cultures of the humanities and therefore, not allowing it (Knöchelmann, 2019; 2020).

It is, in this regard, that the need for a discourse dedicated to the open humanities is imposed, which articulates the entire dimension of the area, including its interests, methods and epistemic practices, and the

technological dimension, thus enabling the adaptation of OS processes to the humanities (Knöchelmann, 2019). To achieve this end, a single voice and a consolidated vision are needed, so that they can unite all the disciplines of the humanities, turning them into a consistent and coherent nucleus at the level of the discourse of the opening of research. It is expected that the discourse around the open humanities will contribute to the recognition of the proportion between the social and the technological in this area, to include all its particularities within the scientific system – that is, to serve as a consolidation of open practices in the area and, at the same time, calling attention to the adaptation of certain characteristics by scientific institutions and funding agencies in science policies for the humanities. With this in mind, it is considered that DH may represent the humanities in the actual scenario of OS and act as an important agent in the consolidation of this discourse, thus enabling the adaptation of open practices in these epistemic cultures.

DH epistemic cultures reveal themselves to be inter and transdisciplinary, implementing certain characteristics of other fields, such as the vision of laboratory life in the production of scientific knowledge (Malazita et al., 2020). At the same time, as they reflect broad characteristics of several disciplines that are revealed in collaborations at the level of production and communication of knowledge, they also integrate into their team's several elements that translate into transdisciplinary cooperation, broader audiences, and that reveal the understanding of the importance of mutual help around of a common good. Also, because they deal with computational processes and data, they can implement research data management, an essential topic for OS. It is also noteworthy the need for an adequate infrastructure aimed at the humanities in which DH can serve as pioneers for the consolidation and adaptation of the OS principles to the humanities.

Summarily, DH play an important role in promoting open research in the scholarly communication system and contribute to the discourse around open humanities, having the potential to reach many stakeholders, and thus overcome several barriers concerning its epistemic cultures. Although, it must be highlighted that, to achieve that, the scholarly communication system needs to be aligned with the diverse epistemic cultures in the humanities, thus developing, promoting, and implementing policies and infrastructures that have in mind the peculiarities of humanities research.

Conclusions

The DH, and its researchers, by encompassing several epistemic cultures, from humanities, social sciences, and science, have a broad vision of the production and communication of research, also having a commitment to the epistemology of the humanities. They play an essential role, giving voice to the development of adequate infrastructures for scholarly communication in the humanities, calling for open access to the results, considering the diversity of prevailing genres; to the quality assurance and evaluation of research; to the impact that the local context and multilingualism play in this culture; and to the inclusion of the various stakeholders so that scholarly communication and the openness of knowledge are a reality in the humanities. Nevertheless, progress has already been made in developing infrastructures for the humanities and humanities sciences, such as the OPERAS and DARIAH projects. At the same time, DH are facilitating the implementation of research data management in their research processes, a key pillar in the discourse around OS.

The discussion around open science practices cannot ignore the diversity of epistemic cultures that make up science. In this work, we tried to reflect on this need, calling attention to the heterogeneity of science, which the unified discourse seems to ignore, so well exemplified in the work of Knorr-Cetina. Thus, it was intended to relate the practices and the knowledge construction environment of the digital humanities with the principles of open science, considering the multidimensionality of the scientific communication system. This reflection points to the need to adopt a specific discourse around the opening of the scientific process that considers the diversity of scientific practices, including in this discourse those specific to the humanities. It is hoped, therefore, to contribute to the creation of discourse capable of positioning the humanities, and particularly the digital humanities, on the horizon of discourses on the construction and dissemination of science.

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