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Paul L. Arthur
Edith Cowan University

Lydia A. Hearn
Edith Cowan University

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Toward Open Research: A Narrative Review of the Challenges and Opportunities for Open Humanities

Paul Longley Arthur and Lydia Hearn

Edith Cowan University, Mount Lawley Campus, 2 Bradford St, Mt Lawley, WA 6050, Australia

Open research represents a new set of principles and methodologies for greater cooperation, transparent sharing of findings, and access to and re-use of research data, materials or outputs, making knowledge more freely available to wider audiences for societal benefit. Yet, the future success of the international move toward open research will be dependent on key stakeholders addressing current barriers to increase uptake, effectiveness, and sustainability. This article builds on "An Agenda for Open Science in Communication," raising dialog around the need for a broader view of open research as opposed to open science through a deeper understanding of specific challenges faced by the humanities. It reviews how the multifaceted nature of humanities research outputs make open communication formats more complex and costly. While new avenues are emerging to advance open research, there is a need for more collaborative, coordinated efforts to better connect humanities scholars with the communities they serve.

Keywords: Open Research, Open Science, Open Humanities, Scholarly Communication, Public Engagement

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Open research, also referred to as open science, is a topic that has recently raised significant global attention among universities, government and philanthropic funders, commercial and open platform publishers, libraries, the information and communication technology (ICT) industry, and the broader public (Fosci, Johnson, & Chiarelli, 2019; Hampson, 2020; Science Europe, 2018). Openness has become a catchphrase for the development of principles, policies, infrastructure, and practices to drive the communication and sharing of research in the public domain through open access to methods, data, tools, software, publications, workflows, and all other forms of openness in the scholarly and research environment with the goal of

Corresponding author: Paul Longley Arthur; e-mail: paul.arthur@ecu.edu.au

increasing quality, efficiency, and credibility of research outputs to drive discovery and innovation (Lewis, Lewis, Xuemao, & Cawthorne, 2015). Open access resources offer online, digital, unrestricted access without payment, as well as free copyrights and limited licensing restrictions for re-use, author attribution, and sustainable preservation (Suber, 2012). Committing to open access, open source, and open data is an ethical and practical option for scholarly communication and knowledge creation (Willensky, 2006).

Today, as academic practices have become increasingly digital, opportunities are arising to widen open access and reshape the tradition of scholars publishing research in closed formats toward a future of more interactive, open communication, and data sharing that reaches broader and more diverse publics for clearer social impact (Beaulieu, Breton, Brousselle, & Harris, 2018; Neylon, 2015). Open research initiatives offer environments where researchers, policy makers, practitioners, and engaged citizens can not only draw from, borrow, re-purpose, and build on already developed research outputs, methods, and data—fulfilling the mandate of scholarship to create, share, and disseminate knowledge—but can also check their credibility by reviewing and scrutinizing the study design, plan, data, and analysis that is available on an open platform (Dienlin et al., 2020). Open research therefore involves activities to broaden opportunities for a more productive, universal design, and use of knowledge and to open pathways for more equitable, inclusive access to new ideas and information focused on finding solutions to global problems and for sustainable development (Boyer, 1996).

Yet, despite the clear potential benefits of open research, significant institutional, systemic, technological, and financial barriers have limited its use (Arthur et al., 2021; Beaulieu et al., 2018; Tennant, Chung, & Steiner, 2020). Internationally, universities and research institutes are increasingly hard-pressed to sustain open access to publicly funded research as the costs of journal, monograph, and open data platforms continue to rise (Australasian Open Access Strategy Group, 2018; Holzman, 2016; Maron, Mulhern, Rossman, & Schmelzinger, 2016). Those in the academic sector—including researchers, administrators, and library and information specialists—voice concerns about the lack of appropriate open research infrastructure at the national and international level (Montgomery et al., 2018). Limited access to credible research has led, in some cases, to misunderstanding and lack of trust in the legitimacy of online sources (Tenopir et al., 2016). Those involved in the open scholarly ecosystem struggle to implement progressive open access and open data policies in ways that meet the needs of all users and stakeholders (Hampson, 2020).

In response, international movements are progressively calling for high-level experts and a broad range of stakeholder representatives to come together to review the most productive, proven approaches (Ali-Khan, Jean, & Gold, 2018; Hampson, 2020; Knowledge Exchange et al., 2019; Mendez et al., 2020; Open Science Collaboration, 2015; Science Europe, 2018; Tennant et al., 2019). At the 40th session of the UNESCO (United Nations Educational, Scientific and Cultural Organization) General Conference in 2019, representatives noted:

> Driven by unprecedented advances in our digital world, the transition to Open Science allows scientific information, data and outputs to be more widely accessible (Open Access) and more reliably harnessed (Open Data) with the active engagement of all relevant stakeholders (Open to Society). However, in the fragmented scientific and policy environment, a global understanding of the meaning, opportunities and challenges of Open Science is still missing. (UNESCO, 2020)

A key outcome of this conference has been the launching of a global consultation process around potential future action based on lessons learned, with the goal of developing a "UNESCO Recommendation on Open Science" due for release in 2021. Despite this positive move, as the title illustrates, emphasis continues to be focused primarily on "open science" as opposed to the broader concept of "open research" that promotes openness of all forms of research, including in the arts and humanities, or what is increasingly referred to as "open humanities" (Eve, 2017; Knöchelmann, 2019; McLaughlin, 2017). While efforts are underway to encourage openness in the humanities—with the support of international groups such as DARIAH (Digital Research Infrastructure for the Arts and Humanities), Open Library of Humanities, Open Edition, Open Methods, the infrastructure of OPERAS (Open Scholarly Communication in the European Research Areas for Social Sciences and Humanities), SciELO (Scientific Electronic Library Online), Redalyc (Red de Revistas Científicas de América Latina, y El Caribe, España y Portugal), and funding from the Mellon Foundation—in practice the humanities still trail behind the sciences in open research (del Rio Riande, Tóth-Czifra, Wuttke, & Moranville, 2020; Knöchelmann, 2019; Suber, 2017).

This article seeks to build on "An Agenda for Open Science in Communication" (Dienlin et al., 2020) by raising dialog around the need for a broader view of open research as opposed to open science, through a deeper understanding of the specific challenges faced by the humanities. It begins by exploring the paradigms and methods underlying research in the humanities that focus more on subjectivity and perspectivity than the objectivity, reproducibility, replicability, and generalizability of the sciences, and questions the need for greater discourse around the concept of *open research*. This is followed by a narrative review aimed at critiquing current barriers, and specifically those in the field of humanities, where the varied and multifaceted nature of research outputs—from books, manuscripts, maps, photographs, artwork, music, and performance, to news, entertainment, and many other kinds of texts (including in languages other than English)—can make their presentation in accessible open formats somewhat different from that of the science, technology, engineering, and mathematics fields. This article also argues that digital humanities has a central role in promoting open research to new and diverse audiences, yet this will require collaborative efforts to overcome barriers confronted across diverse stakeholder levels.

Paradigms underlying open research

Open research represents a new approach made possible by massive advances in ICT over recent decades that now enable the open sharing of knowledge and outreach. While much discussion has focused on practices and norms, little debate has focused on the paradigms and epistemologies characteristic of the different disciplines or fields of study and the purpose of their research and related methodologies—exploratory, experimental, comparative, theoretical, constructive, critical, participatory—and how these influence aspects of the research to be made more openly available (Knöchelmann, 2019). The discourse around *open research* has centered almost exclusively on *open science* underlined by positivism, that is, the concept that research begins by developing a tightly defined theory from which a hypothesis can be deducted, tested, verified, replicated, and generalized to represent a broader group of phenomena (Dienlin et al., 2020). The theoretical assumption around positivism is that research should be objective, tangible, governed by universal and rational laws, employing for example random sampling, high levels of measurement and reductive data analysis to explain, predict, and discover causes and consequences (Sarantakos, 1993).

On the contrary, research in the humanities—ranging very widely and including ancient and modern languages, literature, philosophy, history, archaeology, anthropology, human geography, law, politics, religion, and art—has the purpose of understanding and/or explaining human and social phenomena. As such, research paradigms and epistemologies in the humanities center on interpretivism and critical analysis to explore different social worlds and how these are constructed, interpreted, and assigned meaning in the minds of people, and how they may be shaped by conflicts, tensions, and contradictions that could influence individual and social behaviors, beliefs, and change over time (Kagan, 2009; Sarantakos, 1993; Snow, 2012). Hence, humanists tend to use inductive approaches to gain a deeper understanding and subjective interpretation of reality as people see it to be, rather than the objectivity of the sciences focused on unbiased, systematic and logical outputs that separate facts from values. The nonlinear and nonuniform nature of the philosophies underlying humanities research as opposed to the linear causality of the sciences (Hammarfelt, 2017; Laporte, 2017) are dependent on a culture of debate to generate questions and new informative methods of analysis, through for example source criticism, hermeneutics, nuance and contextual meaning, and phenomenology to encourage a rational exchange of communication for knowledge production (Knöchelmann, 2019; Sarantakos, 1993).

While arguably science that is hypothesis driven could be compared with the humanities—which implicitly or explicitly may involve modes of hypothesis testing—in practice the humanities place more value on interpretations of why and how certain phenomena occur, limiting the statistical power, replicability, and generalizability of qualitative, critical analysis, phenomenological, or hermeneutical approaches (Dienlin et al., 2020). Consequently, the tangible products of humanities research

tend to be quite different from those of the sciences and as such can be presented through a multitude of communication channels and formats, as outlined above. A further difference is that the classical scholarly approach to humanities outputs has tended to involve the production of long publications (primarily books and monographs), often written through the more personal voice of the author, and embedded with footnotes and references (Gross & Ryan, 2015).

Despite these significant paradigmatic differences, as Knöchelmann illustrates, to date open research has been dominated almost exclusively by the core values and practices of *open science*—with emphasis on transparency, reproducibility, pre-registration or pre-print, and re-usability—that may not be easily translated into arts and humanities research practices. As Knöchelmann argues:

> . . .though there is no *one* field of scholarly communication – but at least one for each cluster of scholarship – there is currently only *one* dedicated discourse on open research and scholarship, and this is *open science*. (Knöchelmann, 2019)

While open access to both the sciences and humanities can be historically traced back to the Berlin Declaration (2003), open research has in practice focused more on open science defined as transparent and accessible knowledge shared and developed through collaborative networks (Vicente-Sáez & Martínez-Fuentes, 2018) with the aim of contributing to credibility and ensuring data quality, accuracy, integrity, accountability, reproducibility, replicability, and generalizability (Dienlin et al., 2020; Koltay, 2020). Although terms like *open scholarship* and *open knowledge* have been suggested to reflect the different open research cultures including those of the humanities, arts, and social sciences, much of their focus to date has been on open access publishing (Montgomery et al., 2018; Sidler, 2014). Yet, the broader definition of open research in the humanities—or *open humanities*—includes collaboration, citizen engagement, and making humanities research data, tools, software, and materials available in more findable, accessible, interoperable, and reusable (FAIR) ways, while at the same time ensuring the sustainable preservation and archiving of research outputs (McLaughlin, 2017; Veršić & Ausserhofer, 2019). In response, open scholarship now refers more broadly to the sharing of knowledge and data in the research process through open collaboration with all relevant actors regardless of the discipline. But these terms still require a more detailed analysis of the diverse processes and practices that surround the different disciplines and their research paradigms to develop a broader framework in which to embed *open humanities* than is suggested by straightforwardly employing the same approaches used in open science.

The future success of open research will depend on building greater commitment to understanding the dichotomy between open science and open humanities and in relation to other philosophies. Further attention needs to be focused on open research methods, data, and governance with the goal not merely of improving "transparency and traceability" of research (Dienlin et al., 2020), but also to ensure

scholarly communication involves making research outputs available in more visible, accessible, and usable ways aimed at ensuring greater citizen engagement and more equitable access to knowledge for all (Arbuckle & Siemens, 2015). Only through collaborative discourse, with the goal of learning from one another, can we better recognize and overcome the barriers currently slowing the uptake of open research, especially in the humanities, thereby broadening opportunities for a more productive and readily available public utilization of knowledge.

Challenges to open research

The arts and humanities, like other disciplines, have encountered a series of broad global, institutional, systemic, practical, and socio-economic/cultural equity barriers to the implementation and uptake of open research practices (see Table 1). Despite international calls for the setting up of open research agendas, university and staff academic performance continues to be judged, and funded, according to a world ranking system based on the use of metrics focused on scholarly publication and citation analysis (Haustein, 2016; McKiernan, 2017), with staff promotion and tenureship largely assessed according to research outputs through prestigious scholarly journals and book publishers rather than through collaborative group accomplishments and open research for societal benefit (Odell, Coates, & Palmer, 2016). Moreover, the financial costs imposed by large for-profit publishers to make research outcomes openly available, and the lack of incentives offered by universities for open research has resulted in inertia among many researchers to adopt more open, efficient, and equitable ways to engage the broader public in the development, dissemination, and uptake of their research (Hampson, 2020). At the heart of open research is the drive to build more equitable access to knowledge, through open access platforms and repositories. Yet, this has raised concerns around intellectual property (IP) infringement and copyright laws, resulting in numerous international agreements but with many still varying from country to country (Koutras, 2019). Thus, while emerging digital platforms are offering new spaces for open research practices, the complexity of the academic system, lack of financial incentives offered by universities to support open scholarship, fragmented and siloed nature of open initiatives, limited advocacy and dearth of cross-disciplinary collaboration, together with concern around IP and copyright issues, have hampered the move toward a more engaged and inclusive open research culture by university leaders (Ali-Khan et al., 2018; Beaulieu et al., 2018; Tennant et al., 2020).

At the operational level, barriers confronted by faculty leaders, academic librarians, and ICT support staff include lack of: time, opportunities, and resources to promote the benefits of self-archiving and data sharing through institutional repositories; technical support for newer generation software and infrastructure to offer easy access, storage, and preservation; funding for the up-keep and maintenance of open resources; guidelines around preferred formats to present research content and data in more FAIR ways; opportunities for the development of sustainable

Table 1 Barriers to Open Research

Institutional level barriers	• Open research is given low priority in the face of competing demands • University ranking continues to focus on scholarly publication and citation analysis rather than on the sharing of knowledge through open platforms • Publication is dictated largely by for-profit publishing companies where unsustainable price rises for subscriptions and open access are restricting public access and knowledge equity • Fragmented silos of research according to fields of discipline limit collaboration for innovative open initiatives • Incompatibility between the research paradigms underlying the sciences and humanities limit the full implementation of open research policies • Limited knowledge of how to evaluate open research practices and their impact on public engagement for societal benefit • Concern around IP and copyright issues, as well as standards and software licenses for materials to be shared via public platforms
Systemic/operational level barriers	• Different priorities, commitments and philosophies • Lack of financial commitment, advocacy and leadership to raise visibility, train staff, and support collaborative approaches • Lack of finance for newer-generation software and infrastructure • Excessive time spent on updating the various repositories used by universities • Limited opportunities to promote the benefits of self-archiving and sharing data in repositories for easy access, storage, and preservation • Lack of guidance around preferred formats to present research content and data in more FAIR ways • Lack of training and limited resources to support IT and platform provider engagement with other staff
Practical/financial level barriers	• Not perceived as core focus of their job • Lack of clarity around the concept of open research and the importance of making

Continued

	research outputs freely available to the public whose tax supports their research • APCs and/or BPCs too costly • Priority given to prestigious publishing companies that are looked on favorably by academic committees for promotion and future research funding • Limited training and support • Powerless in dealing with competing demands under high workload and increasing time pressures • Problems of authority, trust, and ethics have resulted in wariness and limited the open sharing of data and outputs
Socio-cultural/equity level barriers	• Restricted Internet access, limited digital literacy skills, and language barriers further exacerbate the digital divide and inequalities at a global scale • Open access journals and platforms produced by prestigious universities or print companies reinforce primary languages (English, Mandarin, Spanish, and Arabic) • Research platforms are produced primarily in isolation without engaging other key stakeholders and users • Limited collaboration with engaged citizens for co-development

collaborative initiatives; and staff training to promote the uptake of open access and scholarship (Knowledge Exchange et al., 2019; Peekhaus & Proferes, 2015). Moreover, today the environment is becoming more diverse but also fragmented as new software and services are added to support data management, preservation, curation, and citation (e.g., Figshare, Omeka, Dublin Core, Schema.org, CollectiveAccess, and others), leading to a need for sector-wide standards for metadata, protocols, and language to ensure interoperability of systems (Benn & Borchert, 2018).

At the practical level, limited awareness among early career humanities researchers of the importance of making their outputs freely available to the public whose taxes support their research (Lemke, Mehrazar, Mazarakis, & Peters, 2019; Narayan et al., 2018), has meant scholars continue to place priority on sole publications in prestigious publishing venues that are looked upon favorably by academic committees for promotion and future research funding (Odell et al., 2016). Even those who are aware of open research issues tend to support the traditional publication practices by submitting to the often slow year-long (or even longer) publication process while also using novel practices of scholarly communication that allow quick online

access to their research outputs (del Rio Riande et al., 2020). Of particular concern is the current disconnect between policy officers, funders, senior university administrators, researchers, university librarians, publishers, and platform developers, who all too often work in isolation with their conceptual framework and approaches toward open research being focused on a unified set of meanings and practices aligned with single fields of research, limiting the progress of innovative cross-sector solutions, and leaving many humanities researchers outside this process rather than participating in it (Hampson, 2020).

At the heart of open research in the humanities is the drive for greater equity of access to open data and support for citizen engagement through open access platforms and repositories to bridge the digital divide and re-align the mission of universities to be "engaged inclusive knowledge societies" (Beaulieu et al., 2018). Publications, manuscripts, conference presentations, and policy statements can now be made openly available online; data, methods, and complex software tools can be shared through digital platforms to offer public spaces for citizen participation in knowledge-based activities; research plans, processes, and outcomes can be presented, discussed, and criticized openly through blogs, wikis, and other such forums, including online chats; and findings can be considered through new peer-review approaches with anonymous or nonanonymous assessors and with opportunities for the public to post open review comments, questions, and assessments (Bartling & Friesike, 2014; Haustein, Larivière, & Sugimoto, 2015; McKiernan, 2017). Yet, the global system still limits the recognition of these advances. While the big private publishers continue to encroach on the global South, pirate sites, like Sci-Hub and LibGen, which violate copyright laws, have been lauded by some academic, scientific and publishing companies for bypassing publishing paywalls and protecting democratic principles (Himmelstein et al., 2018). They can reach a broader audience who would otherwise not have open access to research, because they cannot afford the substantial costs of books or journal subscriptions or are limited by language barriers.

Barriers to the humanities

While these general barriers have affected all fields of research, the humanities have been notably slow to take advantage of open research (Suber, 2017). Many working in the more traditional or established areas of arts and humanities have argued that their research is grounded in detailed analysis of defined topical issues—for example, analyzing historical or contemporary documents, often focused on studies in local regional contexts and language specific communities—making the cost of open access to particular niche audiences unsustainable (Tóth-Czifra & Wuttke, 2019). Within this context, many humanities scholars have struggled to accept an open research culture focused on the self-archiving of their research through open institutional repositories, and have not prioritized Gold open access publications (Lemke

et al., 2019; Narayan & Luca, 2017; Piwowar et al., 2018), or even Green or Bronze open access, which have recently been shown to offer positive alternatives for the humanities (Piwowar et al., 2018).

Focus on books, monographs, and book chapters

All too often humanities scholars and particularly those in long-established areas with publications devoted to their fields have continued to be motivated primarily by the prestige of recognized for-profit print companies (Odell et al., 2016; Suber, 2014). Rather than the use of impact factors that are central to the hard sciences, humanities academic committees continue to place greater emphasis on the informal hierarchy of book publications for job promotion, tenure, and grant funding (Severin, Egger, Eve, & Hürlimann, 2018). Moreover, limited knowledge of the value of open research for democracy and equality has meant many humanities scholars are opposed to open access, in part due to misunderstandings, but also owing to concerns about IP, copyright licensing and plagiarism, or for lack of awareness of, or limited value and legitimacy given to new open access platforms for the humanities (Narayan et al., 2018; Tenopir et al., 2016). While not-for-profit open access publication outlets, such as the Open Library of Humanities, Open Humanities Press, and Open Book Publishers are gaining prominence, many scholars continue to consider these to be of lower quality than the established journals, books, and monographs of top-tier commercial publishers (Peekhaus & Proferes, 2015).

To date, much of the debate around open research in the humanities has focused on the ongoing sustainability and high costs of open access to books and monographs (Eve, 2017; Gross & Ryan, 2015; Severin et al., 2018). In practice, open access is not "free" but rather often involves article processing charges (APCs) or book processing charges (BPCs), generally paid for by the author, university, or research institute. The economic cost of books or manuscripts compared to journal prices is also significant. The typical cost of APC for open science journals is approximately US$2,000–$3,000 per article, compared with the cost of long-form open humanities publications that can range from US$15,000 to as high as US$130,000 for copy editing, typesetting, legal copyright, and digital preservation of primary sources such as artifacts, photographs, creative writing, illustrations, and musical interpretations (Maron et al., 2016; Walters et al., 2015). While subscriptions to journals can spread costs across many international universities and research institutions, the high price of open access to humanities books can strain even the wealthiest universities (Eve, 2017). Thus, some humanities scholars are recommending a move toward journal publications rather than an emphasis on books (Gross & Ryan, 2015), and the use of green open access with embargo periods (limited to 12 months) especially as their readership and citation may have a lengthier life-time than most science publications (Severin et al., 2018).

Restrictions to pre- and post-print

Making available pre-print and post-print versions of journal articles and other publications through institutional repositories is commonplace for many disciplines due to permissions offered by the Creative Commons Attribution public copyright licenses. But the use of repositories, especially for uploading pre-prints, remains rare in the humanities (Laporte, 2017). A pre-print is a full draft of a publication before it has been peer-reviewed, while post-print is a draft copy of the manuscript after it has been peer-reviewed and accepted for publication, but before it has been typeset and formatted by the publisher. A major barrier initially for the humanities was the dominant focus by institutional repositories and platforms on scientific journal articles, with the support of large international initiatives such as the Public Library of Science and ArXiv. In contrast, far fewer services emerged for the humanities, and many humanities scholars have been somewhat negative toward prioritizing these forms of open access due in part to the diverse and multifaceted nature of their research outputs—which often makes their intended audience much smaller, and where the time span and critical mass for the uptake of pre-print or post-print may be limited (Laporte, 2017). More classical criticisms have been around the fear of others borrowing or claiming ideas prior to publication, and quality control (Eve, 2017).

The emphasis in the humanities on critical analysis and discourse arguably creates further obstacles for pre-print of humanities publications. Humanities researchers often place greater value on the historicity or diverse layers of explanation and the semantic depth of their research, which can include acknowledgement of reviewers' counter arguments and subsequent corrections. This arguably illustrates the importance of speeding up the publication process of the humanities instead of using pre-prints as a "temporal placeholder" (Knöchelmann, 2019).

Perhaps the greatest barrier has been the lucrative business model developed by the large commercial publishing companies, that today own around 70% of journals globally and are now increasingly buying the software and infrastructure for the new scholarly ecosystem (Larivière, Haustein, & Mongeon, 2015). While some renowned university presses and learned societies have developed new strategies and have professional marketing teams, approximately half of the smaller enterprises have entered into co-publishing arrangements with the major commercial companies to provide them with the necessary sales, copyright, editing, and new technology services (Fyfe et al., 2017). But this has resulted in very limited knowledge among academic societies of how these processes are being driven by the interests of their for-profit making publishing partners, which maintain copyright and limit open access to research outputs (Inger & Gardner, 2013).

Added to this disruption has been the unsustainable rise in subscription costs and "big deal" packages aimed at providing seamless access to online literature that has outstripped library budgets of even the most prestigious universities (Barbour & Nicholls, 2019). To address growing frictions with the commercial publishing industry, individual countries, and universities—primarily those in developed countries—

are now entering into one-on-one "transitional agreements" and membership programs with major publishers to reduce open access and post-print embargoes, and offer discounts on subscription fees and article and book process charges (Borrego, Anglada, & Abadal, 2021). While some have defined these transformative agreements as temporary and transitional (aimed at constraining costs of scholarly communication, fostering equity in scholarly publishing, retaining author copyright, and ensuring that their needs and those of their institutions are addressed), others have described them as a streaming service aimed at towing the line between open access and financial stability (Neff, 2020). Today, increasingly, major U.S. and European universities, together with government and philanthropic research funders, are pressuring publishers to adopt open access with limited restrictions. But while key commercial publishers have market values in the billions of dollars, such changes are not likely to occur without a struggle. This is not to say these companies should not profit; opening access will merely reduce the size of their profit.

Moreover, massive online open access to knowledge requires not just improving on financial and presentational barriers through access to pre- and post-print versions, but it should also encourage greater equity and participation for true knowledge exchange (McKiernan, 2017). Without the resources of prestigious Western universities, where English is the predominant language, all too often open access reinforces exclusion. For example, SciELO is a bibliographic database, digital library, and a cooperative electronic publishing model for open access journals aimed at increasing the visibility and access to scholarly information primarily for those in Latin America, Spain, and Portugal. While these include some 5,408 journals, less than 300 of these appeared on the 2019 Web of Science listed journals, with less than half of these published in languages other than English (Neff, 2020). Although social networking platforms like ResearchGate, Academia.edu, and LinkedIn can provide alternative access for societal benefit, limited financial support to develop, implement, and maintain open access, together with lack of trained staff, and confusion around copyrights for the sharing and reuse of images from primary sources remain continual problems (Narayan et al., 2018).

Limited use of open peer review

Another issue in the debate around open research in the humanities is that of "open" peer review. The practice of peer review began as far back as 1665 as a way of assessing and verifying the legitimacy of academic ideas being presented, and where necessary, guaranteeing improvements were made prior to their printed release to a broader intellectual audience (Moed, Burger, Frankfort, & Van Raan, 1985). Over time, peer review has been considered a rigorous system aimed at ensuring high-quality standards for the effective communication and dissemination of research findings (Finch et al., 2013). But today increasingly the quality of peer review is being questioned, with some arguing that too much emphasis is being placed on a publication's technical soundness, rather than on its novelty, originality, or

significance for society (Eve, 2020). In addition, concerns are being voiced around the selection and worthiness of reviewers, their accountability and credibility, and the time it takes to complete the review process (Crane & Martin, 2018; Ferguson, Marcus, & Oransky, 2014; Huisman & Smits, 2017). Debate is emerging around how peer review could better democratize scholarship by creating a stronger bridge to link the often small group of elite "gatekeepers," who oversee the reviewing of publications, with those trying to disseminate their work (Knöchelmann, 2019). In the humanities, the typical editor is highly connected with the field and has values aligned to the journal or publisher topic. Thus, increasingly, it is being suggested that the peer review process in the humanities should be more "open" to allow a culture of debate during and post publication. Publishing through open peer review, with recognition of who the reviewers are, could make reviewers' comments and terms of inclusion more transparent, while also honoring the time and commitment provided by reviewers to the publication (Knöchelmann, 2019).

Collecting, managing, preserving, and sharing research data in the humanities

Beyond merely open access to publications, or final research outputs, open research includes making research data openly available for use and re-use. This implies, in addition to the storing or archiving of data by the researcher for their or their research institute's primary use, that the data should also be made available for secondary analysis not just for the purpose of accountability, but for new research and development (Borgerud & Borglund, 2020; Upward, 2000). Open data offer increased opportunities for visibility, verification, and authentication of research, and can strengthen collaboration and speed up further research and innovation.

The digital humanities are offering new avenues for the humanities more broadly by shifting the way knowledge can be created and shared between scholars, students, the public, and other aligned groups including galleries, libraries, archives, and museums (Arbuckle & Siemens, 2015; Arthur & Bode, 2014). Humanities research increasingly includes large amounts of data, different types of digital archives, databases, multimodal media texts, and complex software and tools in areas as diverse as digital cultural heritage and deep mapping, language and translation technologies, data visualization and modeling, and many other applications (Bartling & Friesike, 2014; McKiernan, 2017; Veletsianos & Kimmons, 2012). The digital humanities have supported the promotion of open research in the humanities through considerable contributions to the development of digital tools and approaches to transform scholarly communication practices and open up and engage research (Arbuckle & Siemens, 2015; Arthur, 2019), supporting the broader agenda of *open humanities* to better connect academics with the communities they serve (Knöchelmann, 2019).

Yet, in practice, making humanities data open continues to pose significant challenges for the majority of researchers (ALLEA, 2020; Borgerud & Borglund, 2020; Buddenbohm et al., 2016). While all humanities researchers use data, few interpret

or define their research outputs as "data" and as such do not systematically record their results in a digital format that is easily understandable and usable by others (Swijghuisen Reigersberg, 2015). Many such researchers consider data as something that is quantitative or numerical and argue that the term "data" oversimplifies the complex phenomena and highly specialized nature of the humanities (Tóth-Czifra, 2019). However, data consist not just of lists, tables, or matrices with organized, numerical, categorical, or ordinal information; in the case of humanities, data can also include archival documents or historical artifacts, oral histories, sound and video recordings, or theatre performance recordings (to take just some examples), and these may be obtained from primary or secondary sources (ALLEA, 2020). Once again this illustrates how the underlying concept of open data is too often aligned with the positivist theory of open science focused on the objectivity of the term "data," rather than the interpretive and constructive critical theories that are typically drawn upon by humanities scholars.

Data management plans in the humanities

In our increasingly data-driven world, the sharing of research data is becoming crucial to the humanities landscape. New and emerging tools have the capacity to simplify data processing, allowing complex mining, indexing, and presenting of outputs via selective channels. This requires the development of clear data management plans, not only for the archiving of data, and the verification and identification of any errors, but also to ensure the data are presented in more usable and understandable ways, and where possible, made more openly available for reuse by the wider public for societal benefit. In the case of the humanities, data management depends on subjective judgments about origin and methods of collecting and processing the data; authenticity, acceptability, applicability, and understandability of the data; and reputation or bias of those responsible (Koltay, 2020). Data management plans are therefore central to maintaining data quality and integrity, and help to clarify aspects of: research design; the creation and processing of data; identification of data to be used and its source; management and storage of data; analysis and combining of data from multiple sources; easing of access and availability of data; legal and regulatory issues; and overseeing of data governance for archiving, preservation, security, and sustainability (Hashem et al., 2015). This involves describing from the beginning of the research process which data will be used, how this will be archived, and what can be shared (Buddenbohm et al., 2016).

In practice, however, humanities research data have a wide range of content types, formats, metadata schemas, and typologies. Whereas the sciences place greater emphasis on data in their publications, humanities data are rarely made available, and even when they are placed in repositories and archives, seldom are the data easy to find or use (Borgerud & Borglund, 2020). In part, this is because humanities studies often involve small, diverse datasets produced by a sole researcher (Burgelman et al., 2019). Despite the growing number of tools available to access

and manipulate data, these tend to be difficult to use, leaving even the most motivated researchers feeling frustrated (Neylon, 2017). As such humanities data are frequently poorly presented, with data missing, or with incomplete descriptions of datasets, limiting their reuse, and with technology and digital programs for storing the data quickly becoming obsolete (ALLEA, 2020). Thus, despite advances, the management of open data requires detailed attention and allocation of time, but in general research grants in the humanities involve small amounts of funding over a short period, limiting their ability to adopt novel new approaches for the dissemination of findings (Swijghuisen Reigersberg, 2015). Moreover, while increasingly publishers are calling for Data Availability Statements on where the datasets can be accessed, limited institutional or repository staff support continues to hamper the management and maintenance of these.

Humanities data can include not only digital data but also nondigital data, for example manually annotated text or hard copies of field notes. Equally, humanities may include not just primary data but also data that belongs to cultural heritage and gallery, library, archival, and museum (GLAM) institutions. As such, the researcher may not necessarily be the copyright owner of these data, making the labeling of, and open access to these research data more difficult, especially when the pictures, images, and text represent something or someone other than the actual object or person, or when these are linked to gallery, exhibition, or museum artifacts or catalogs that contribute to the institution's income (Swijghuisen Reigersberg, 2015). Thus, while open data are essential for the building of more equitable access to knowledge, and gallery, museum, or archival collaborators may share the data in good faith, open access to and re-use of these data can cause legal and ethical conflicts (Koutras, 2019). Fundamental to overcoming this is the adoption of liberal copyright licenses, such as Creative Commons Attribution licenses that impose no limits on the use and reuse of data as long as the original source is acknowledged. However, in the humanities, scholars have often opted for nonderivative licenses disallowing data/text to be derived from the original text (Swijghuisen Reigersberg, 2015).

A further problem is that anonymity of data is often confused with confidentiality (Borgerud & Borglund, 2020). Protection of sensitive personal data sometimes cannot be guaranteed through anonymity. In such cases, "mediated access" as opposed to full open access can be used to ensure data integrity, often through password-protection, allowing only some data to be used and reused by authorized parties and through the signing of ethical agreements. Challenges may also exist due to the variety of languages, the nuance of arguments, and expressions in the humanities, which can result in misrepresentation or inattentive referencing (Knöchelmann, 2019). Despite the development of guidelines around acknowledgement and citation practices, together with numerous changes to copyright and IP laws emerging internationally—with the support of philanthropic entities like the Mellon Foundation and the Wellcome Trust—legal restrictions and difficulties still

exist and there is a continual need for these laws to keep pace with technological evolution (Koutras, 2019).

In this section, we have outlined challenges and potential opportunities for open research in the humanities. Addressing these barriers will be dependent on working closely with all key stakeholders to increase the uptake, sustainability, and effectiveness of open research practices.

Engaging stakeholders in the humanities open research environment

Open access to research has had two key purposes: the "communication" and the "certification" of knowledge, primarily through peer-reviewed journals (Ren, 2015). Yet, in recent years, the open research landscape has been influenced and socially shaped not only by the new technologies used to enact openness, but also by the roles, attitudes, and motives of diverse stakeholders and the social, cultural, economic, and political systems in which they are embedded (Hampson, 2020; Knowledge Exchange et al., 2019). Individual researchers work within universities and research institutes that are funded by government agencies, philanthropic entities, and industry groups. Their research is supported through libraries, scholarly communication societies, other universities, participants from the general public, and in the case of humanities, by cultural heritage and GLAM institutions (Buddenbohm et al., 2016). Ultimately, their research materials are presented and shared through the collaboration of academic and commercial publishers, open knowledge groups, editors, journalists, digital repositories and infrastructure groups, and the ICT industry. The primary motive for open research among each one of these stakeholders varies significantly—for example it can center around greater collaboration, higher impact and university ranking, the connecting of resources, responsive research and innovation, accountability and transparency, or equity and sustainability—and so too do their barriers and challenges differ, as illustrated in Table 1. Yet today, there is an urgent need for greater collaboration to fundamentally shape and make improvements to the open environment. The roles of key stakeholders within this process are outlined in Table 2.

Toward open solutions in the field of humanities

Despite the many challenges outlined above, and the need for greater collaboration between stakeholders, the infrastructure to support open solutions in the field of humanities has grown substantially in recent years (Buddenbohm et al., 2016; Ross-Hellauer, Schmidt, & Kramer, 2018). Change is being driven by national and international government policy, with the financial support of funding bodies like the Wellcome Trust, the Gates Foundation, and the Andrew W. Mellon Foundation, and through the creation of open access publishing platforms. Major global networks and large-scale infrastructures include, for example, the Humanities Commons platform, DARIAH, and OPERAS, the EU-based social sciences and

Table 2 The Role of Key Stakeholders in Promoting Open Research

Stakeholder groups	Key roles
Individual researchers	These are the main data users and producers of research data, who can work with all stakeholders to ensure the data are made available in formats that are accessible, understandable, usable, and preservable to ensure authenticity, quality, and for reuse. They can engage in open research if they feel supported, that is, if the academic environment recognizes and rewards their work; provides infrastructure, training and time; assists with the APC and BPC costs of making their publications openly accessible; and provides data management services and platforms offering security for the storing and sharing of their data
Universities and research institutions	These can unite with major scholarly societies, funding agencies, the ICT industry, and senior university-level committees to place emphasis on the global importance of exploring new open infrastructure and approaches that meet the needs of researchers. There is a need to establish better standards and world university ranking systems that encourage critical thinking and creativity in our digital environment rather than remaining focused on traditional bibliometric indicators ranked against league journals and books
Public and private funding agencies	These can actively promote optimal use and reuse of data, and can also play a central role in raising awareness of sound data management practices, but this requires supporting and investing in the design and maintenance of data infrastructure
Libraries and digital repositories	These represent key advocates for action, and can support and connect researchers with open resources to make their research outputs and data freely available. Digital repositories can provide persistent identifiers and descriptive metadata to preserve and sustain the data, but this requires working closely with other stakeholders to make these more Discoverable, Accessible, Re-usable, Transparent, and Sustainable (the DARTS Framework) (Hampson et al., 2020)

Continued

Table 2 Continued

Stakeholder groups	Key roles
ICT industry and infrastructure groups	These oversee the planning and design future open research infrastructure and software and can influence global standards for implementation and integration. Through greater collaboration, software development companies, technologists, and technicians at academic libraries and research centers can better design navigable systems that work to ensure researchers have access to systems that can be made interoperable and open—clarifying what information is needed, how and where the data could best be archived, what the preferred file formats are, which licenses and version controls are required, and who should be responsible for managing and reviewing online changes (McKiernan, 2017)
Journal editors	These play a significant role in improving journal standards. Through collaboration with senior administrators of research institutions, national policy officers and funding agencies, they can take a leadership role in reducing the influence of impact factors by highlighting the importance of open access and new Altmetrics systems
Academic and commercial publishers	These can play a crucial role in modifying their publishing policies to facilitate open access and are increasingly working with advocates and Creative Commons licensing to support academic advances and assume corporate responsibility for social good. This includes making publications openly available and providing persistent identifiers to cite and link papers to related data
Open knowledge infrastructure and support groups	These provide sustainable business models for open access through working with international foundations, and groups like DARIAH, Open Library of Humanities, Open Edition, and Open Methods, and offer the infrastructure to deliver content to communities in more diverse and open ways
Cultural heritage and GLAM groups	These are central to providing data for the humanities. By working closely with researchers, museums, archives and cultural

Continued

Table 2 Continued

Stakeholder groups	Key roles
	heritage institutions can explore the benefits of open sharing of data in ways that increase efficiencies, reaching a broader public, while at the same time ensuring preservation of data for future use
Global entities	These include organizations such as UNESCO and the European Economic Commission that promote worldwide open research initiatives, and gain the support of major funding agencies, to make international agreements for the open sharing of data and the improvement of citizen engagement. Together they can work to improve open standards by introducing international law and regulations to unify access and change copyright protection and IP regimes, aligning these with the governance frameworks of open access repositories
Engaged citizens	These members of the general public help improve access to data and research findings through engaging with humanities researchers, non-governmental and GLAM organizations, and by playing a role in the production of data through active citizen participation including crowdsourcing

humanities network that are systematically integrating books, monographs, and humanities data into the European Open Science Cloud.

Open publishing services—such as the Open Library of Humanities, Open Book Publishers, Open Humanities Press, OpenEdition, Knowledge Unlatched, Ubiquity Press, and Language Science Press—are developing new approaches to assist in covering the APC and BPC costs of open access. Open Humanities Press is sustained in partnership with the University of Michigan Library and charges no article processing fees, while the Open Library of Humanities has developed a model of library partnership aimed at overcoming the current situation where academics produce publications that are given sometimes at a cost to publishers, who then sell these publications back to the academic libraries. Others, like Knowledge Unlatched, use membership models and the pooling of library consortia (Eve, 2017). While Knowledge Unlatched is the largest initiative in the humanities, it has recently changed from being a British not-for-profit company to a German-based private for-profit company, yet it affirms its goal to become the "central open access platform," with emphasis on transparency from publishers regarding data usage

(Knöchelmann, 2018). Open Book Publishers also specialize in open access to books for the humanities and social sciences and use institutional grants and crowdfunding to support their publication costs. The OAPEN online library and publications platform, together with the Directory of Open Access Books, provide information about open access resources in publishing as a quality-control for open access books and journals, while also providing services for publishers, libraries, and research funders.

In addition to open publishing services, numerous bibliographic databases and digital platforms are also emerging. In the humanities these include the long-established Social Sciences Research Network (owned by Elsevier Publishers since 2016), the Center for Open Science, and the highly recognized SciELO, which has recently launched a pre-print platform (Ross-Hellauer et al., 2018). Open archives for free access to publications after the initial embargo, together with open repository aggregators of digital collections like OpenAIRE in Europe, SHARE in the United States, and La Referencia in South America support the discovery of open research outputs by collecting, organizing, and systematizing access to information on open access publications (Ross-Hellauer et al., 2018). *The Conversation*, a not-for-profit network linking academics and journalists, enables humanities researchers to publish news stories, under the Creative Common License, aimed at making research rapidly accessible to a much wider audience.

Open Methods and other open data platforms are also widening their reach to meet humanities scholars' needs. DARIAH is a well-known example promoting one large-scale integrated platform across Europe dedicated to enhancing and supporting digitally enabled research and teaching across the arts and humanities via digital collections and tools. In other examples, the Open Content Alliance, Internet Archive, institutions such as the British Library, Digital Public Library of America, and National Library of Australia, as well as numerous other international organizations are now using integrated tools, and new and innovative projects to create permanent, publicly accessible archives of digitized texts. On a smaller scale, collaborative efforts are leading to many related projects like the *Time-Layered Cultural Map*, an Australian online research platform to deliver national-scale infrastructure for the humanities, focused on mapping, time series, and data integration. By linking geo-spatial maps of Australian cultural and historical data, adapted to time series, it is enabling researchers to visualize hidden geographic and historical patterns and trends, while also building online resources which can present to a wider public the rich layers of cultural data related to Australian locations.

Cultural heritage and GLAM institutions are also playing a key role in facilitating greater data fluidity through adopting novel technological and archival approaches that are greatly improving access to and the reusability of a wide range of scholarly information and source materials and collections. By reaching wider audiences, cultural heritage and GLAM institutions are championing the open sharing of cultural memory and social practices through projects like: the Venice Time

Machine that is building an open digital archive of the city's cultural heritage covering more than 1,000 years of evolution; Coding da Vinci, a German culture hackathon to share GLAM data; and the Dutch Rijksmuseum, which provides digital images of objects from its collection and descriptive object information and bibliographic data from their data services without restrictions on reuse (Tóth-Czifra & Wuttke, 2019).

Conclusions

Technological advances are opening pathways for researchers to share their outputs, methods, and data, maximizing visibility of their research and building more equitable access to knowledge, information and ideas for societal benefit. Universities are facing a transitional moment: new research methods, data and tools are evolving, and scholarly communication is transforming from a closed, print-centric culture to an open network of researchers, organizations, and institutions. Together with technological innovation, the identification and analysis of data that was previously hidden or inaccessible means research is entering a new era of design and development allowing for the sharing, re-use, analysis, and manipulation of data underpinned by digital methods and standards that are creating valuable new avenues for open research.

However, despite the considerable benefits of scholarly communication becoming more transparent and traceable, in practice significant barriers have emerged. Standardization can lead to the perpetuation of a lack of innovation and autonomy, with credit being influenced by a systemic world ranking bias, and through unsustainable economic costs of private publishers that do not adequately benefit those who create or support the research (Barbour, 2019). But, while committing to open access, open source, and open data is an ethical and practical option, it does not come without significant challenges. Despite major international efforts like the Open Scholarship Initiative, supported through UNESCO, to actively promote, align, and facilitate open research (aimed at improving discoverability, accessibility, reusability, transparency, and sustainability), numerous barriers have prevented these from being fully realized by researchers, especially in the field of humanities.

To address these barriers, the authors have emphasized the urgent need for greater discussion around the philosophies and communication practices underlying open research, and have illustrated how too much emphasis has been placed on *open science* as opposed to *open research*, with the humanities being given less importance. While the skills and strategies of humanities scholars in the study of language, use of archives, sensitivities to culture, concerns with perspective and regard for ethics and morals could have considerable public, political, and cultural impact, in practice building sustainable infrastructure for open access to publications, data, and methods in the humanities often requires niche approaches and formats grounded in regional, national, and language-specific communities. As digitalization increasingly becomes an everyday part of our research environment, the ability to

access and interface with deeper layers, stores, and flows of digital data and research outputs will have significant impact on the arts and humanities generally. Yet, achieving this requires major changes within the higher education sector, and above all, it will require greater incentives, support, and recognition for the adoption of open research in the humanities.

Efforts we make now to understand and address these barriers—individually and collectively—will fundamentally shape the future landscape for many years to come. As open research increasingly becomes part of our society, all stakeholders must be intentional about understanding and designing these new open systems to ensure that they are inclusive, equitable, and truly serve the needs of a diverse global community. Yet, open does not mean free, and the cost of making research openly available may result in amplifying of the already existing north–south divide. Thus, the success of such initiatives depends on building an international commitment to open research philosophies to overcome barriers and broaden opportunities for a more equitable, sustainable and readily available public utilization of knowledge (Kingsley, 2013; McKiernan, 2017). Achieving this will require greater understanding of the dichotomy between the sciences and humanities with the goal of exploring and solving research challenges through greater collaboration and cross-disciplinary lenses. While it may be more difficult for the humanities sector than that of the sciences to speak through a single voice, it urgently needs to engage in discourse on ways to advance open research and communication practices (Knöchelmann, 2018).

Within this context, digital humanities researchers are well placed to encourage open research practices and networks, as well as reaching and engaging with members of the public who may not be traditionally aligned with, or be an expected audience for, academic work. Digital humanities involves the integration of new ways of doing research through collaborative, transdisciplinary, and computationally engaged research, teaching, and publishing practices. It brings digital tools and methods to the study of the humanities with the recognition that the printed word is no longer the main medium for knowledge production and distribution (Burdick, Ducker, Lunenfeld, Presner, & Schnapper, 2012). Yet, if digital humanities is to play a central role in bringing together scientific and humanities research methods and data for the advancement of "open research," the field must continue to support and foster complementary and coordinated efforts from all stakeholders to productively address the significant identified barriers currently facing the humanities.

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