



Recognising Digital Scholarly Outputs in the Humanities

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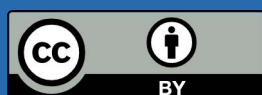
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Recognising Digital Scholarly Outputs in the Humanities

ALLEA Report | **November 2023**

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Executive Summary

The increase in digital practices and open outputs in the humanities' scholarship should be understood as a standard evolution of scholarly practices that take advantage of digital technologies. To accommodate these novel forms of digital scholarly practices, the assessment systems require recognition of (1) **interdisciplinarity**, (2) **novel means of conducting research**, and (3) **innovative scholarly outputs** that go beyond traditional genres (such as books or articles).

The first section of this report discusses the cross-cutting issues pertinent to digital practices in the humanities:

1. Linking studies with underlying data.

Providing the underlying resources of research by linking to them directly from publications builds up the transparency of the research process and allows for quick access to such data and resources, thereby enabling reproducibility and supporting data reuse.

2. Open-ended outputs. Open-ended outputs allow for update and improvement of already published work and for updates when the state of the art in the given field changes. Hence, the update and maintenance of resources should be acknowledged as a regular type of output of scholarly work.

3. Contribution and authorship. Current authorship attribution schemes often do not reflect collaborative inputs well, and a variety of contributions go overlooked as invisible labour. The role of each contributor should be clearly described and reported, while different roles need to be recognised for what they are.

4. Training and competence building. Providing better knowledge and understanding among

researchers engaging with digital methods – both as active researchers or as readers and evaluators – is crucial to build their competencies.

5. Reviewing and evaluating. The innovative outputs pose a challenge to reviewing and evaluating practices on many levels. Evaluators and reviewers should have relevant knowledge both in the subject and technology.

The second section provides recommendations on evaluating particular case studies of innovative outputs where the aforementioned cross-cutting issues manifest themselves:

1. Digital scholarly editions

2. Extended publications

3. Databases and datasets

4. Infographics, maps, and visualisation

5. Code

6. Blogs

7. Podcasts

Each case study includes an example of the practice and recommended reading.

In conclusion, this report argues that the catalogue of good research practices in the humanities has grown exponentially. We call for the recognition of novel outputs as valid scholarly work that needs to be properly and rigorously created (using standards and best practices), evaluated (applying relevant evaluation criteria), and rewarded (transforming research assessment frameworks).

Introduction

The system of research assessment and evaluation is often at odds with the practices of the humanities' scholarly community. Although the range of technological possibilities available today enables scholars to produce a richer variety of outputs, traditional formats, such as monographs, articles, or essays, still remain dominant in this community. Furthermore, innovative work is often invisible to research assessment and evaluation, which tends to neglect digital practices.

Consider the example of the [Polish Literary Bibliography](#) (PBL), a research infrastructure providing access to over three million records on Polish culture, aggregated with resources from other countries, which could be used both in traditional scholarship as well as in data-driven approaches. Yet, when a new national research unit assessment begins, recent records from the database are converted into a PDF monograph – serving no practical or conceptual purpose apart from meeting the expectations of what ‘valid scholarly output’ in the humanities entails. In this report we employ a more inclusive definition of outputs, understood here as different forms of research results that are made available and, in line with [The European Code of Conduct for Research Integrity](#), “include, but are not limited to, publications, data, metadata, protocols, code, software, images, artefacts, and other research materials and methods”.

The increase in digital practices and open outputs in the humanities' scholarship should be understood as a standard evolution of scholarly practices that take advantage of digital technologies. Although traditional genres, such as monographs, articles, or essays, remain dominant in present-day humanities research, the range of technological possibilities allows scholars to redefine those forms of expression and enrich them with other media or formats. During a series of [interviews conducted by OPERAS](#), humanities and social sciences scholars were asked about their understanding of innovation in scholarly communication. First, they considered innovation as improving access to traditional resources like articles, monographs, and research data. Second, innovation was also understood in terms of formal innovations allowing for better ways to transmit ideas thanks to new technologies and novel means of interacting with content.

However, as the aforementioned example of the PBL shows, innovation is not always supported by the current academic assessment system and often happens despite it. As asserted in a recent statement by the [Czech Association for Digital Humanities](#), the failure to recognise digitally-based research by the evaluation systems contributes to the marginalisation and declining competitiveness of social sciences and the humanities. Similarly, the latest position paper by [Digital Research Infrastructure for the Arts and Humanities \(DARIAH\)](#) argues for the role of infrastructural work in research assessment, positing that “research infrastructures need users and contributors who receive appropriate academic rewards for participating in Open Science practices”. However, it is worth noting that there is already some work being done to change the prevailing norms within national assessment systems; for instance, [initial decisions on the UK Research Excellence Framework 2028](#) specifically mention that “supporting and rewarding a diversity of research outputs is important for the progress of research and its dissemination to diverse audiences” (REF 2023, p.8).

To accommodate novel forms of digital scholarly practices, assessment systems require recognition of three key components of digital humanities (DH) work: (1) its **interdisciplinarity** in applying tools and methods from Information and Communications Technology (ICT), social sciences, and other disciplines or industries; (2) **novel scholarly practices** that allow for new forms of conducting research with the use of those technologies; (3) **innovative scholarly outputs** that go beyond traditional genres (such as books or articles) but need to be considered as valuable ways of communicating results.

The work presented in this document is thus picking up our work where the previous ALLEA report, [Sustainable and FAIR Data Sharing in the Humanities](#), left it. As the report concluded back in 2020: “The present recommendations, therefore, join other voices in encouraging research institutions, policymakers, and funders to fundamentally review their research support services, as well as their definitions of the roles and activities that feed into research under this new paradigm.” The present report further explores the issue of what research has become in the humanities, and how we should adapt institutional policies to emerging scholarly

needs. One particular area being explored here is the issue of novel formats of scholarly communication in the humanities and their evaluation.

Some reflection on recognising novel scholarly outputs was previously undertaken by the European Commission's working groups on [recognising Open Science practices](#) and, more recently, [on reforming research assessment](#). The latter resulted in the creation of the Coalition for Advancing Research Assessment (CoARA), which was [joined by ALLEA](#) and many of its member academies. This report intends to contribute to the first commitment of CoARA's [Agreement on Reforming Research Assessment](#), i.e., to "broaden recognition of the diverse practices, activities and careers in research, considering the specific nature of research disciplines and other research endeavours" (CoARA 2022, p.4). However, we strongly believe that all changes and suggestions should stem from actual scholarly practices rooted in their disciplinary contexts. Thus, we want this report to become a supporting tool for reflective processes conducted in humanities institutions engaging with assessment reform.

Scholarly communication practices in the humanities have disciplinary-specificity that needs to be properly understood in the context of developing adequate assessment measures. First, the breadth of the argument tends to be valued more than the speed with which the findings are communicated. Hence, monographs usually play a more important role in the humanities than in other disciplines, which tend to focus on reporting findings through journal articles. Moreover, there are many discipline-specific genres that are often underestimated by evaluators and funders, such as scholarly editions, online databases, bibliographies, dictionaries, or encyclopaedias. Second, although digital technologies make it possible to present outputs as digital platforms, they still have an ambiguous status in academia. Together with such new genres as academic blogs, interactive web platforms, open notebooks, or digital datasets, digital outputs struggle to gain legitimacy in the humanities; what often occurs is a double publication, e.g., the results of the project are additionally published as a monograph, traditional article, or data paper to secure proper credit for another research output. Additionally, these modern and innovative scholarly outputs are often products of collaborative effort and evaluation systems of the humanities do not yet handle collective authorship well. Some of the novel genres, such as podcasts or blogs, often even encourage authors to consider non-academic audiences who would not be reached by traditional outputs, e.g., a specialised monograph.

Finally, following the [FAIR](#) and general Open Science principles, novel outputs are more accessible to the public and prone to reuse in scholarly work in a variety of ways.

These are precisely the reasons why initiatives like CoARA intend to reshape the evaluation of research by including a wider range of (mostly open) outputs. This is also why this report advocates for the recognition of novel forms of scholarly outputs in the humanities in both top-down and bottom-up manner. To address the former, we want to provide insights for research institutions, funders, and policymakers to reflect on the assessment of these outputs. On the other hand, we encourage scholars to adopt the new formats for the diffusion of research findings in the hope that these outputs will soon be adequately reflected in the up-to-date research assessment systems.

In the course of our work, we prepared the recommendations and categorised them into two main sections. First, the report focuses on the cross-cutting issues pertinent to digital practices in the humanities as a whole, which are (1.1) **linking studies with underlying data**, (1.2) **open-ended outputs**, (1.3) **contribution and authorship**, (1.4) **training and competence building**, and (1.5) **reviewing and evaluating**. Next, it discusses particular case studies of innovative outputs where these cross-cutting issues manifest themselves, such as (2.1) **digital scholarly editions (DSE)**, (2.2) **extended publications**, (2.3) **databases and datasets**, (2.4) **infographics, maps, and visualisation**, (2.5) **code**, (2.6) **blogs**, and (2.7) **podcasts**. Each case study includes an example of the practice. It should be noted that the list of examples is by no means exhaustive, but rather serves as an illustration for readers unfamiliar with a particular type of output. All examples are followed by recommended resources, which could be useful for readers. We chose to include only open access content in English for easier use. Finally, some general remarks on recognising and evaluating digital practices in the humanities are collected in the conclusion.

It needs to be stressed that the present report is intended as a reflective tool for humanities researchers and institutions willing to engage with the evaluation and assessment of novel scholarly outputs. It does not provide a detailed and comprehensive review, which would go beyond the capacities of this volunteer-based expert group. However, the report should be used as a starting point for deliberation, with the recommendations and suggested readings meant to guide readers working on their own particular approaches within institutional and national contexts.

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1. Cross-Cutting Issues

1.1 Linking studies with underlying data

Overview

Referencing the source material for a particular claim is a common practice in scholarship. Various citation styles have been optimised to balance the high information load of a footnote while saving as much precious space in the text as possible. Readers, in turn, use citations to locate and access this material. Digital technologies enable both the creation of hyperlinks between published texts, as well as the ability to better access the sources cited within.

In the previous report, we focused on the different types of humanities data, highlighting the need to apply common standards and FAIR principles, i.e., they should be **f**indable, **a**ccessible, **i**nteroperable, and **r**eusable. However, the focus then was on the data themselves, but now we want to highlight the importance of thinking about data as an inseparable part of the publication process. Thus, we need to value and encourage the publication of additional materials, like data or software, both as static datasets and/or dynamic visualisations.

Underlying data consist of digital materials such as a wide range of different primary sources or aggregated data, e.g., in the form of database records. Providing the underlying resources of research by linking to them directly from publications builds up the transparency of the research process and allows for quick access to such data and resources. First, it allows for easier reproducibility of the claims and validation of research results. Second, it supports data reuse and their further aggregation and normalisation in different datasets.

Recommendations

» Data and code accompanying the publication should be sustainably stored in appropriate places, and linked to the text by Persistent Identifiers (e.g., DOI, Handle, URN, ARK). If possible, allow access to dynamic data (i.e., databases) so that other researchers can explore them as well.

- » Data and code should have clear licensing information attached, which regulates the reuse; open licences are preferred.
- » Create links, not just citations. Proper data linking to publications, in line with existing guidelines, should be recognised as good research practice.
- » Use output formats that facilitate data linking, such as HTML, rather than less accessible ones such as PDFs.
- » A Data Management Plan (DMP) should be designed and followed early on, which will guide data handling in the project and serve as a draft of future documentation to be stored together with data outputs

Further reading

Burton, A., & Koers, H. (2016). *ICSU-WDS & RDA Publishing Data Services WG Interoperability Framework Recommendations (1.0)*. Zenodo. <https://doi.org/10.15497/RDA00002>

Harrower, N., et al. (2020). *Sustainable and FAIR Data Sharing in the Humanities: Recommendations of the ALLEA Working Group E-Humanities*. Digital Repository of Ireland. <https://doi.org/10.7486/DRI.tq582c863>

Hollander, H., et al. (2018). *PARTHENOS Guidelines to FAIRify data management and make data reusable*. Zenodo. <https://doi.org/10.5281/zenodo.2668479>

Larrousse, N., & Gray, E. J. (2021). *Recommendations for FAIR Data Citation in the Social Sciences and Humanities*. Zenodo. <https://doi.org/10.5281/zenodo.5361718>

Rauber, A., Asmi, A., van Uytvanck, D., & Proell, S. (2015). *Data Citation of Evolving Data: Recommendations of the Working Group on Data Citation (WGDC)*. <https://doi.org/10.15497/RDA00016>

1.2 Open-ended outputs

Overview

Communication technologies, like writing or print, have always influenced how the content is structured, delivered, and perceived by audiences. However, the advent of the digital age reconfigures once again the way we approach the ‘finiteness’ of outputs, which can be fluid and constantly updated. Digital textuality allows for something Juhás et al. (see *further reading*) called “continual improvement in scholarly publishing”. In this approach, a scientific paper is not a finite work but a “dynamic document evolving in time, which can have different versions and releases”, often in reaction to iterative peer review. Thus, from this perspective, scholarly texts are treated like software releases – they are constantly improved and updated to respond to the changing environment (see Juhás et al., 2018, in *further reading*).

The paradigm of continual improvement does not refer solely to texts but also to databases and data collections. Obviously, the world of print already knows continuous publications, for instance, encyclopaedias with supplements, printed bibliographies with volumes published yearly (and their appendices), as well as subsequent editions of the same work (some of them updated). However, digital outputs give more freedom and flexibility because they allow for easy updates and versioning of already published content. Due to this digital transformation, we also need to acknowledge that some scholarly works, such as software or data standards, may be subject to updating and improvement.

Open-ended outputs allow for the improvement of already published work and for updates when the state of the art in the given field changes. They may also allow for collaborative work and quick feedback mechanisms, enabling comments that can be later used to improve the text. In the next section, we discuss open-ended outputs such as digital scholarly editions (DSE), extended publications, databases, or software.

Recommendations

- » Acknowledge updates and maintenance of digital scholarly work as a regular type of output that needs to be recognised and evaluated accordingly.

- » Manage authorship correctly because updates in the form of supplements, comments or reviews, may be made by researchers other than the original authors.
- » Open-ended outputs need to apply versioning standards, summing up the work that was provided for the update.
- » Funding institutions should be open to projects that are not focused on creating new outputs but rather on providing necessary continuation and improvement to an existing output. Updates of work could be considered qualitatively, e.g., through a description (annexe) of the kind of work that was performed in updating.
- » Institutions should consider whether a particular research gap would be better addressed through a completely new output or rather by updating an existing one.
- » The update and sustainability of outputs should be considered both in technical terms (maintaining the outputs, updating the software), as well as in intellectual terms (producing updates, editing them, agreeing about updates). These procedures should be embedded into the workflow.

Further reading

Adema, J. (2021). *Living Books: Experiments in the Posthumanities*. MIT Press. <https://doi.org/10.7551/mitpress/11297.001.0001>

Edmond, J. et al. (2020). *Digital Technology and the Practices of Humanities Research*. Open Book Publishers. <https://doi.org/10.11647/OBP.0192>

Juhás, G., Molnár, L., Juhasova, A., Ondrišová, M., Mladoniczky, M., & Mažári, J. (2018). *Continual Improvement Process in Scientific Publishing*. In ICETA - IEEE Int. Conf. Emerg. ELearning Technol. Appl., Proc. (pp. 245-250). Institute of Electrical and Electronics Engineers Inc. <https://doi.org/10.1109/ICETA.2018.8572053>

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1.3 Contribution and authorship

Overview

Humanities researchers are often pictured as lone figures locked down in their studies, like in the many depictions of Saint Jerome, that are often taken as the model representations of a scholar. However, the collaborative nature of humanities research has long been evident in monumental, decades-long projects of editions, dictionaries, and lexicons, not to mention journal editing. Contemporary humanities, particularly digital humanities, rely on different forms of contribution and collaboration, which are further reinforced by the need for specific, interdisciplinary expertise to be shared within the research team. However, current authorship attribution schemes often do not reflect collaborative inputs well, and a variety of contributions often go overlooked as invisible labour.

Each contribution should be considered as a part of the research process and credited in the output to clearly acknowledge its importance. Otherwise, due to systemic constraints, researchers may tend to only engage with outputs they get credit for, which may not provide the most insightful or impactful results. For instance, if one is not credited for publishing the data from a study, the incentive to do so is very low, even if the possible reuse could lead to important discoveries.

Recommendations

- » [CRediT \(Contributor Roles Taxonomy\)](#) provides a taxonomy of 14 typical contributor roles: conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualisation, writing (original draft), and writing (review and editing). Recognise that the authorship of the output is just one of the contributing activities, often performed by a collective.
- » The role of each contributor should be clearly described and reported, and different roles need to be recognised for their significance.
- » All authors and contributors should use identifiers (e.g., [ORCID](#)) to facilitate proper automatic credit allocation.

- » To review outputs properly, reviewers should have expertise in collaboration and represent different roles, allowing for a proper assessment of results.

Further reading

Clement, T.E., et al. (2021). *Collaborators' Bill of Rights*. In *Digital Pedagogy in the Humanities*. Humanities Commons. <https://hcommons.org/deposits/item/hc:31187/>

Committee on Publication Ethics (COPE). (2019). *Authorship* [Discussion document]. <https://doi.org/10.24318/cope.2019.3.3>

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Whyte, A., & Herterich, P. (2021, June 2). *Professionalising the Research Software Engineer and Data Steward roles – towards models for collaboration and good practice*. Presentation at the FAIRsFAIR Roadshow. https://fairsfair.eu/sites/default/files/3%20FinnishRoadshow_DataSteward_coordination.pdf

1.4 Training and competence building

Overview

It is worth emphasising that the digital transformation of outputs and methods is not only limited to digital humanities but concerns the humanities domain as a whole. Non-digital-humanities scholars could learn how to incorporate particular digital tools and methods into their research workflows and outputs. For instance, scholars working with data may acquire competencies in data archiving and sharing; those willing to publish a digital edition could do a course on [XML and TEI](#) annotations; those wanting to apply quantitative techniques should be able to acquire data science skills.

Digital humanities (also called, in different contexts, computational humanities or humanities

computing), in a narrow sense, is the fundamental and methodological study of carrying out research in the humanities employing digital data, computational models, and automatic (algorithmic) procedures. Digital humanities also, in a broader sense as the diffusion of digital methods and practices throughout the whole humanities domain, has a very significant impact on all humanities disciplines, affecting theoretical concepts, the objects of research, methodological approaches, and research workflows. In both cases, it is a requisite to have stable and digital humanities-specific training in place in any curriculum for handling digital techniques and technologies.

Providing better knowledge and understanding among researchers engaging with digital methods – as active researchers, readers, or evaluators – is crucial to build their competencies. This, in turn, will allow for better scrutiny of existing work and knowledge advancement in the field.

Recommendations

- » On the institutional level, it is important to provide interdisciplinary education and knowledge transfer in the humanities, establish competence centres in digital humanities, build supporting alliances, and institutionalise such practices through the establishment of relevant positions (e.g., Chair in Digital Humanities).
- » Methodological training in computational technology should be provided to humanities scholars. This should entail addressing knowledge representation problems and making use of computer analysis tools and software. The training should also include legal regulations on the processing of digital objects. Scholars need to be aware of the ways in which the digital paradigm affects the way we do research.
- » Provide adequate pointers for students so that they can acquire the more practical skills that are best taught in the context of using actual research data.
- » Reviewers also need to possess sufficient competencies to evaluate a digital output (see section 1.5).

Further reading

Various digital humanities course registries provide an overview of teaching activities in the field:

- The [Digital Humanities Course Registry](#), maintained by DARIAH and CLARIN
- [DARIAH-Campus](#) provides a variety of domain-specific digital humanities courses

Buzzetti, D. (2019). *The Origins of Humanities Computing and the Digital Humanities*. *Humanist Studies & the Digital Age*, 6(1), 32-58. <http://journals.oregondigital.org/index.php/hsda/article/view/4644>

Manola, N., et al. (2021). *Digital Skills for FAIR and Open Science – Report from the EOSC Executive Board Skills and Training Working Group*. <https://op.europa.eu/en/publication-detail/-/publication/af7f7807-6ce1-11eb-aeb5-01aa75ed71a1/language-en>

1.5 Reviewing and evaluating

Overview

The innovative output formats pose a challenge to reviewing and evaluating practices on many levels. First, when it comes to reviewing individual outputs, the referees need to possess interdisciplinary expertise in both the target domain and the digital technologies employed. The same applies to internal evaluation within institutions, search committees, or other assessment practices, whereby sufficient competence should be represented to adequately assess outputs that do not fall into traditional formats.

There is a risk that innovative digital practices and outputs are not treated as equal to the more established and traditional formats, and thus remain invisible. This often results in the issue of 'double publications', whereby an innovative or non-standard output is republished in a more traditional form to meet prestige criteria (similar to publishing a database as a PDF monograph mentioned on page 5 of this report). Such needless duplication blocks innovation and disincentivises the exploration of innovative formats by researchers. This practice, which not only needs to be questioned in terms of resources, is also accompanied by an assessment culture oriented towards traditional outputs, which makes appreciative, well-founded, and competent evaluations of 'digitally innovative' formats difficult.

Recommendations

- » Evaluators and reviewers should have relevant knowledge both in the subject and the technology. If a singular person does not possess all the skills required for such assessment, it should be performed by a team of evaluators, with each one focusing on their area of expertise and producing a joint evaluation.
- » In the case of more technologically elaborate outputs, some sort of feedback or review may be needed at an earlier stage to avoid the need for major improvements after the technological development is finalised.
- » The focus of a review should be on the overall outcome not solely on the form, i.e., whether the output communicates relevant knowledge or generates the desired effect on the audience, as in the case of more experimental, art-driven scholarship in the humanities.
- » When using innovative resources, the actual source should always be cited, not the printed or PDF variant. To support this practice, creators should provide clear how-to-cite instructions for their innovative output.
- » Consider building feedback mechanisms into outputs, like commenting or flagging database entries, to enable post-publication updates and improvement. This could also take the form of open peer review, whereby comments from reviewers, responses from the authors, and updated versions of the output are visible to the reader.
- » Agree on how to review particular types of novel, interdisciplinary outputs. Reviewers should follow the criteria established by the institution or funding agency in line with FAIR principles, thereby providing a framework of reference and evaluation criteria that correspond with Open Science requirements. Further sections provide some considerations on this matter.

Further reading

Bell, D., et al. (2015). *Guidelines for the Professional Evaluation of Digital Scholarship by Historians*. American Historical Association. <https://www.historians.org/teaching-and-learning/digital-history-resources/evaluation-of-digital-scholarship-in-history/guidelines-for-the-professional-evaluation-of-digital-scholarship-by-historians>

Burton, M., et al. (2019). "Digits: Two Reports on New Units of Scholarly Publication." *Journal of Electronic Publishing* 22, no. 1 (2019). <https://doi.org/10.3998/3336451.0022.105>

CoARA (Coalition for Advancing Research Assessment). (2022). *Agreement on Reforming Research Assessment*. https://coara.eu/app/uploads/2022/09/2022_07_19_rra_agreement_final.pdf

Hicks, D., Wouters, P., Waltman, L., et al. (2015). Bibliometrics: The Leiden Manifesto for Research Metrics. *Nature*, 520(7548), 429–431. <https://doi.org/10.1038/520429a>

MLA. (2012). *Guidelines for Evaluating Work in Digital Humanities and Digital Media*. <https://www.mla.org/About-Us/Governance/Committees/Committee-Listings/Professional-Issues/Committee-on-Information-Technology/Guidelines-for-Evaluating-Work-in-Digital-Humanities-and-Digital-Media>

SHAPE-ID. (2021). *Shaping Interdisciplinary Practices in Europe Toolkit*. <https://www.shapeidtoolkit.eu>, particularly the guide to evaluating interdisciplinary and transdisciplinary research; and a reflective tool on the expertise needed for this task.

The Declaration on Research Assessment (DORA). (2013). Retrieved from <https://sfдора.org/read/>

2. Case Studies

2.1 Digital scholarly editions

Overview

Critical editions are a traditional genre of knowledge production in the humanities, as they provide methodological means to collect, edit, and reintroduce earlier literary work to contemporary audiences. Since the nineteenth century, a consensus has been developed as to which elements print editions – mostly of historical documents or manuscripts – should consist of, and which methodological principles should be observed if, as critical editions, they are to meet certain demands of a discipline. The critical examination of source materials according to edition-philological principles remains a core element of all editing. But it has also become clear that digital editions are more than just (retro-)digitised printed editions since the digital transformation of the work process, the preparation and visualisation of the objects, as well as their diffusion and analysis lead to a fundamental expansion of the research process and the resulting findings.

The constituent elements of a digital scholarly edition (DSE) can be divided into three layers: (1) the underlying data model, (2) the presentation and publication of the findings, and (3) technical aspects. The best practices regarding each of these three layers may differ depending on the material, such as textual manuscripts and their tradition, source materials like historical records, letters, collection of images, sound, scores, digital-born or digitised data, etc., as well as the intended target audience such as scholarly peer groups or a broader circle of addressees. It is equally important to define the extent of envisioned interaction with the target group as this has consequences for the technical set-up of the edition. Whatever solution is chosen for the DSE, it should be well-documented, comprehensible, and accessible. Finally, the intended output – digital-only or digital edition and printed copies – should be decided at the very beginning of the preparatory stage. Solutions that allow multiple forms and formats of editions have a clear advantage.

Examples

The academy project [*Alexander von Humboldt auf Reisen. Wissenschaft aus der Bewegung*](#) comprises the complete edition of Alexander von Humboldt's manuscripts on the topic of travel at the interface of cultural and natural sciences. This includes travel journals, diaries, memoirs, and publications in the countries and regions visited, as well as correspondence. For more details, see the review by Benauer, M. (2020). At the intersection of sciences, humanities and technologies – A review of the edition humboldt digital. *RIDE*, 13. <https://doi.org/10.18716/ride.a.13.4>.

Recommendations

- » When assessing and evaluating DSEs, refer to standard criteria as those developed by Institut für Dokumentologie und Editorik (IDE) and applied in the *RIDE* journal by Sahle and Vogeler and the members of the IDE (2014).
- » Ensure that reviewers appointed to evaluate the work follow these guidelines and have sufficient competencies to evaluate not only the subject, content, and methodology of the publication but also its technological aspects. Reviewers with diverse competencies could work as a team and provide a joint evaluation.
- » Acknowledge different contribution levels, e.g., contributors doing mark-up or programmers providing software solutions.
- » Make the text available apart from the DSE to allow data reuse in other scholarly contexts. Text and mark-ups should be accessible apart from the publication as DSE, e.g., as research data in standard formats, securely stored in a data repository

Further reading

Driscoll, M. J., & Pierazzo, E. (Eds.). *Digital Scholarly Editing: Theories and Practices*. Cambridge: Open Book Publishers. <http://books.openedition.org/obp/3381>

RIDE – A Review Journal for Scholarly Digital Editions and Resources. (2014). Retrieved from <https://ride.i-d-e.de/>

Roelli, P. (2020). *Handbook of Stemmatics: History, Methodology, Digital Approaches*. Berlin. <https://doi.org/10.1515/9783110684384>

Sahle, P., Vogeler, G., members of IDE. (2014). *Criteria for Reviewing Scholarly Digital Editions, version 1.1*. <https://www.i-d-e.de/publikationen/weitereschriften/criteria-version-1-1/>

TEI P5: Guidelines for Electronic Text Encoding and Interchange. (1994). Last updated in September 2022. Retrieved from <https://guidelines.teipublisher.com/>

Van Mierlo, W. (2022). "The Scholarly Edition as Digital Experience: Reading, Editing, Curating." *Textual Cultures* vol. 15, no. 1. <https://doi.org/10.14434/tc.v15i1.34504>

2.2 Extended publications

Overview

The name 'extended publication' stands here for all types of innovative publications that go beyond the logic of the finite printed text, as manifested in print or electronic postscript formats such as PDFs. Such text is conceived as a static presentation using predominantly the medium of the word. Extended publication, also known as a computational book, a multimedia monograph, or a multimedia collection, on the other hand, harnesses the digital medium to enable certain writing and reading practices to not only transmit the argument better but also to enable interaction with the source material. Thus, the text often becomes a vehicle to communicate the research process and associated materials, linking the text, data, and often, code, while remaining open for updates (see sections 1.1 and 1.2 above).

The scripted word becomes just one of the elements of a multimedia argument using different means. Usually, the full understanding or assessment of such text requires knowledge of multiple fields

(e.g., coding, statistics, visual studies) and may expect different competencies from the readers. Similarly, different readers may focus on different layers of the text. For instance, only those skilled in programming could take advantage of the code, while others may only be interested in the data to reuse them elsewhere. Therefore, the ideas are conveyed through different media, which in some cases allow interaction with the content.

An extended publication entails all or some of the following elements:

- » Embedding various media types (written word, 2D images, 3D images, audio, video)
- » Providing access to data and/or code underlying the study
- » Providing dynamic visualisations of data (e.g., networks or graphs with sliders)
- » Applying mark-up to texts
- » Inviting feedback by providing options for content annotation or comment by readers

Examples

The [Journal of Digital History](#) (JDH) is an international, peer-reviewed, open access journal that provides a publication platform dedicated to data-driven scholarship and transmedia storytelling in history. JDH employs a 'multi-layered approach' to textuality that includes: (1) a narration layer containing the scholarly argument, (2) a hermeneutic layer focusing on methodology and visualisation, and (3) a data layer providing access to data. While navigating the text, readers may switch between the layers, depending on their interests and expertise.

Recommendations

- » An extended publication requires an interdisciplinary approach to evaluation, allowing for the assessment of the quality of results as well as other elements and the usability of interactive components. To some extent, the RIDE reviewing principles discussed in the previous case study (section 2.1) could be of help.
- » Proper interdisciplinary evaluation of the output may require competencies from different fields: subject matter, data sharing, and software criticism. When assessing data-sharing practices, follow ALLEA

Working Group E-humanities recommendations. For software assessment, see section 2.6 below.

- » The extended publication and its elements (text, data, code, image, audio, video) should be considered both analytically in their own right and synthetically as an overall outcome. Thus, we need to seek cooperation between reviewers with different competencies to provide an overall assessment, taking into consideration the usability of the output.
- » Preservation of the output, i.e., storing the whole output or its elements in appropriate places (e.g., GitHub for software, Zenodo for data), should be taken into account.

Further reading

Adema, J., & Steiner, T., Bowie, S. (2021). "Part 2: A Typology of Experimental Books." In *Books Contain Multitudes: Exploring Experimental Publishing*. PubPub. <https://doi.org/10.21428/785a6451.cd58a48e>

Burton, M., & al. (2019). "Digits: Two Reports on New Units of Scholarly Publication". *Journal of Electronic Publishing* 22(1). <https://doi.org/10.3998/3336451.0022105>

Maryl, M. (2020). *Computational Monograph: Reading and Writing Distant Horizons*. JLTonline 14 (2). <http://www.jltonline.de/index.php/reviews/article/view/1090>

2.3 Databases and datasets

Overview

Humanities research often includes collecting objects (data) or information about them (metadata) in a structured way, in the form of a collection or an archive. Particular examples of such collections include dictionaries, lexicons, or bibliographies as long-term humanities projects often hosted by academies, collecting structured knowledge about a particular field or subject.

In the digital context, when non-material content is being collected, such collections of research data often take up the form of databases or structured datasets. By dataset, we mean a standalone file containing research data stored separately in a repository or on a hard drive. A database, on the other hand, is a collection of consistent data, stored

– together with their metadata and annotations – in a logical and structured manner with the use of dedicated software, allowing for queries and data retrieval. Archaeology has been a pioneer among disciplines in the use of databases.

Another important type of dataset is a corpus of linguistic material that is used in various research contexts, including machine learning. A corpus is a collection of written or transcribed texts, which are selected according to certain research goals and often used as a representative sample for a particular type of discourse. The process of constructing and annotating a corpus is research-driven, thus the output should be recognised as a scholarly resource that enables further discoveries

Examples

The [Europeana Eagle Project](#) provides a single portal to the inscriptions of the Ancient World aimed at both professional users and the larger public.

There are journals specialising in publishing data papers that provide detailed descriptions of scholarly datasets: [Research Data Journal for the Humanities and Social Sciences](#), [Journal of Open Humanities Data](#), and [Journal of Open Archaeology Data](#).

Recommendations

- » To facilitate reuse, dataset description should include metadata (how it was created, what is the content, description of fields, and formats), information about the standards used for data collection (including the provenance of data), and storage (also through linking with methodological background papers or data papers). A data sustainability strategy should be a part of the evaluation of the entire output
- » A database or dataset should be FAIR by design, i.e., adopt the standards and principles allowing for its easy findability, accessibility, interoperability with other sources, and data reuse.
- » This includes standardised data and metadata schemes, and data exchange protocols: external metadata that describes the datasets, internal metadata that is embedded in the dataset and describes the collected and published data, as well as technical protocols on how to discover and access data. Specific disciplines,

repositories, or data centres may guide, or even dictate, the content and format of metadata. Examples of such standards are [METS](#), [TEI-XML](#), and [IIIF](#).

- » A critical part of the proper assessment of such resources is the documentation in the form of a report or data paper that describes the content and creation of the dataset or database, explaining all the choices made by the creators, the metadata used in the process, the volume of the resource, as well as the licensing and reuse procedures.
- » Use quantitative indicators to assess the importance of work by looking at who (which platforms, projects, Wikipedia entries) uses or aggregates the data, or by checking the number of queries of the database, or downloads and views of the dataset.

Further reading

Gebru, T., et al. (2019). "Datasheets for Datasets." *ArXiv*. Retrieved from <http://arxiv.org/abs/1803.09010>

Harrower, N., et al. (2020). *Sustainable and FAIR Data Sharing in the Humanities: Recommendations of the ALLEA Working Group E-Humanities*. <https://doi.org/10.7486/DRI.tq582c863>

Ramsay, S. (2004). "Databases." In S. Schreibman et al. (Eds.), *A Companion to Digital Humanities*. Blackwell, Oxford. Retrieved from <http://www.digitalhumanities.org/companion/>

Stanford University. (2023). *Databases*. Online Course. <https://online.stanford.edu/courses/soe-ydatabases-databases>

2.4. Infographics, maps, and visualisation

Overview

Although the graphical representation of data is a well-established method in the humanities inquiry, its popularity has grown in recent years due to the vast data resources available thanks to digital transformation. The aim of data visualisation is either exploratory, i.e., providing an overview of the data collection and allowing for new insights including spatial analysis, or explanatory, i.e., presenting particular findings from a study.

Infographics may allow new insights or address new audiences by offering visual pathways of exploration. Visualisations of research outputs may be scholarly works themselves or effective tools for the popularisation of research results. Common types of data visualisation are diagrams, maps, and graphs (networks). The visualisation as a research object includes data sources, visualisation of data (either static, interactive, or immersive), and documentation of all elements (data source, visualisation method, and applied tools).

Examples

[Cartography of COVID-19](#) is a transatlantic, cross-sectoral collaborative project, orchestrated by the Ars Electronica Research Institute, aiming to reflect on knowledge communities and structures, as well as analyse and visualise data on COVID-19-related scientific literature. The visualisation has a layer of concepts and researchers. While browsing the dynamic graph, users may explore which concepts are covered by particular authors.

[The Stanford Geospatial Network Model of the Roman World](#) (ORBIS) provides a dynamic visualisation of various data regarding transportation in the Roman Empire and reconstructs the time-cost and financial expense associated with a wide range of different types of travel in antiquity. It provides information on distances, duration of travel, and prices according to various modes and routes of travelling as well as at various times of the year, as well as extensive documentation of the project

Recommendations

- » Visualisations should not be mere 'pictures', but rather elements of the scholarly argument, rooted and explained in the context of the research. They should allow for a better understanding of the data and thus need to be linked with the argument and the analyses.
- » The documentation of visualisation should provide the description of key elements: data source, visualisation method, and the tools applied. If the visualisation is based on previously published materials, they should be referred to with a Persistent Identifier.
- » Visualisation is an interpretation of data. The rhetorical power of visualisation should be considered in how it allows for better understanding and communication of the subject, as compared with verbal expression.

- » The sustainability of visualisation and its components should be assessed.
- » In the case of cartographic sources, the exemplary digital representation of a map should include its scanned image, geo-referenced image (if possible), its content in machine-readable format (at least toponyms), metadata, and access point ([WebGIS](#) application and/or [OGC](#) services).

Further reading

Bradley, A. J., et al. (2018). "Visualisation and the Digital Humanities: Moving Toward Stronger Collaborations." *IEEE Computer Graphics and Applications*. <http://hdl.handle.net/2451/43762>

Drucker, J. (2011). "Humanities Approaches to Graphical Display." *DHQ: Digital Humanities Quarterly*, 5(1). <http://www.digitalhumanities.org/dhq/vol/5/1/000091/000091.html>

Rodighiero, D. (2020). "Drawing Network Visualizations on a Continuous, Spherical Surface." *24th International Conference Information Visualisation (IV2020)*, Melbourne and Vienna. <https://doi.org/10.5281/zenodo.4139775>

Sinclair, S., et al. (2013). "Information Visualization for Humanities Scholars." In *Literary Studies in the Digital Age*. <https://dlsanthology.mla.hcommons.org/information-visualisation-for-humanities-scholars>

With rising code literacy (colloquially defined as the ability to read and write code), such code tools are written and developed by humanities researchers themselves, or in co-creation with RSEs (Researcher Software Engineers) or interdisciplinary code-literate colleagues. Such 'bespoke' or 'tailor-made' code can grow into uniquely valuable, and even critical, scholarly assets for humanities research. The ability to get scholarly code and software routinely evaluated and credited as part of an academic endeavour is also essential to the matters of production and sustainability because it facilitates the allocation of financial and human resources for their creation and maintenance.

Examples

[Stylo](#) is an R package with specific computational analytic functions enabling literary research into stylistics. It is arguably one of the most valued and go-to tools in scholarly stylistic research. However, for the matter at hand, it should be noted that no formal code tests are part of the package, nor has the code been subject to technical and scholarly review. Furthermore, to be creditable for the scholarly effort involved with developing the code the authors point to a print publication.

[Stemmaweb](#) is a unique web service for the stemmatic analysis of variant texts (stemmatology is the study of the genealogical relation of documents) and text collation-related data curation. The software is not accompanied by formal code tests, nor has it been formally reviewed. Academic credit for the code work involved with creating and maintaining Stemmaweb has mainly been attributed to scholarly publications.

[CollateX](#) is a highly successful tool for the automatic collation of (historical) texts. CollateX is actively maintained by a sizeable community of scholarly software developers and humanities researchers. The code base includes formal automated [tests](#). No peer review or other formal review of the code has ever been put forward, and credit has mainly been associated with a key publication.

Recommendations

- » Recognise that code and the creation of code are not merely support labour that can be outsourced to external developers, but that much of this work has a significant impact on the innovation of research methods and design, on the quality of analysis, and the type of questions that can be answered in the humanities.

2.5 Code

Overview

Software code is a special, double form of text: one is code as the written form of machine instructions, and the other is the result that arises when such code is executed. Such a result might be an interface enabling interaction with some scientific data, visualisation from the encoded text related to a digital edition, or it could be the listing of analytic results from a computational analysis of literary texts. Being strictly formal, yet extremely versatile and cross-medial, software code is increasingly used by humanities researchers as a tool in scholarly data creation, analytic investigation, and scholarly communication.

- » Recognise the differences between generic (meeting general requirements of many customers) and bespoke (tailored to specific needs) code, and stress the importance of academic accountability and the ability to gain academic credit for bespoke code development by both RSEs and programming scholars.
- » Integrate courses on tool and code development in humanities curricula, and award ECTS to such courses.
- » Provide stable funding (schemes) for research-software development in recognition and support of the scientific contribution and value of software and code.
- » Promote good practices and responsibility in tool and code development for scholarly purposes, i.e., promote iterative development, embedded programmers, test-driven development, open-source coding, code repositories, etc.
- » Promote the use of a software management plan (SMP) if a code base evolves into, or is intended from the start to be, reusable software.
- » Promote the *direct* citation of software and code bases rather than the citation of related articles. A good practice is to provide ‘how to cite this resource’ guidelines in the code or software package.
- » Make software and bespoke code bases creditable in academic publication registration systems in use by academic institutions.
- » Stimulate research into practicable forms of code (peer) review in a scholarly context.

Further reading

(2023). *What is a Research Software Engineer? A definition by the Netherlands eScience Center* (1.0) <https://doi.org/10.5281/ZENODO.7994286>

(2023). *Research Software Engineer at the Netherlands eScience Center: Job Description*. <https://doi.org/10.5281/zenodo.7805870>

Amsterdam Declaration on Funding Research Software Sustainability. (2023). *Zenodo*. <https://doi.org/10.5281/zenodo.8325436>

Marino, M. C. (2020). *Critical Code Studies*. MIT Press. <https://mitpress.mit.edu/books/critical-code-studies>

Martinez-Ortiz C., et al. (2022). *Practical Guide to Software Management Plans*. Amsterdam, Netherlands eScience Center. <https://doi.org/10.5281/zenodo.7038280>

Journal of Open Source Software. <https://joss.theoj.org/>

Van Zundert, J. J. (2022). *Scholarship in Interaction*. Leiden University Scholarly Publications. <https://hdl.handle.net/1887/3464403>

2.6 Blogs

Overview

Humanities scholars often engage with wider audiences through genres more accessible to the lay public, such as press columns or essays. It seems that academic blogging, at least partly, serves similar purposes by engaging audiences with smaller bits of knowledge, ideas, and informed opinions. Given the casual nature of the format, as well as its relative straightforwardness in terms of technical preparation, blogging has become an important scholarly activity. Moreover, it allows for a faster exchange of arguments as compared with more traditional research outputs, where formal procedures prolong the time between the first draft of a text and the moment of its final publication.

[Resources prepared by the London School of Economics](#), which hosts some of the most renowned academic blogs, distinguish between three kinds of academic blog posts: (1) blogging for content (informing about current research in the form of an open notebook); (2) blogging for comment (contributing to public conversations and debates based on one’s own research and experience); and (3) blogging for reportage (reporting on events or readings).

Blogs could be hosted on scholars’ websites, as an institutional blog, or as a part of a blogging platform like WordPress or Hypotheses. Similar functions could be served by some microblogging platforms and social media, although they seem to be more ephemeral, and the best practice is to share

blogged content as a link on social media. Thus, blog posts could be seen as small interventions and interactions with other scholars and wider audiences.

Examples

[Hypotheses](#) is an international platform for science blogs founded in 2009, which provides a simple blogging service to a broad academic community in the humanities and social sciences, including researchers, teams, doctoral students, library science and documentation professionals, and institutions. It currently hosts more than 4,500 academic blogs in various languages. The platform uses WordPress with some additional plugins for easy set-up and maintenance.

Recommendations

- » Blogs should be treated as a lightweight, public-facing scholarly activity, which could also 'recycle' content from other research outputs by providing a popular and more accessible description of the findings. Thus, basing a blog post on an already published work should not be seen as a disadvantage, but as a means of achieving impact.
- » There is great freedom in blogging, but good blogging practice should include (self-) archiving, source citations, and should itself be properly citable, including identifiers.
- » The evaluation of the impact of blogs could use such metrics as the number of views, interactions (comments, likes), or mentions in social media.

Further reading

Burton, M. (2015). *Blogs as Infrastructure for Scholarly Communication* (Doctoral Thesis). University of Michigan. Retrieved from <https://deepblue.lib.umich.edu/handle/2027.42/111592>

London School of Economics and Political Science. (n.d.). *Academic blogging*. LSE. <https://info.lse.ac.uk/staff/services/knowledge-exchange-and-impact/kei-guide/academic-blogging>

Zou, H., & Hyland, K. (2020). "Academic blogging: Scholars' views on interacting with readers". *Ibérica*, (39), 267–294. <https://doi.org/10.17398/2340-2784.39.267>

2.7 Podcast

Overview

Although the term 'podcast' seems to be currently applied to a wide range of audio formats, in the academic setting it is strongly connected with dialogic genres. Just like blogs, academic podcasts leverage popular interest in the genre to convey academic content. Oral formats of lectures, seminars, or interviews have a long tradition in humanities' scholarship, published in journals along with regular articles, allowing for a more popular and synthesised take on the work of content creators and/or their interviewees. Podcasts reinvent this genre around recording live discussions that are usually, but not always, arranged exclusively for this purpose.

There are several elements that strongly distinguish scholarly podcasts from traditional publications such as academic books or articles or even novel but text-based outputs, such as blog posts or digital monographs. Usually, academic podcasts are parts of a series revolving around a person (e.g., a particular interviewer), institution, or a project hosting the podcast and broadcasting its topical focus. Moreover, the oral-first format invites a more conversational, and less technical, way of formulating one's thoughts.

Examples

[Open Science Talk](#) is a publishing service featuring podcasts, provided by the University Library at the Arctic University of Norway. Nearly 50 episodes have been created to-date since it first went live in 2018. The focus is on 'openness' in the scholarly world, covering topics such as [Open Access](#), [Open Data](#), [Open Research](#), [Open Education](#), [Citizen Science](#), [Open Health](#), [Open Software](#), and features interviews in English with a wide range of guests with expertise and experience in such fields. It improves its sustainability through affiliation with Crossref, OASPA, and the Association of European University Presses. The platform also uses the [Open Journals Systems](#) as the basis for its infrastructure (platform and workflow).

Recommendations

- » Aside from the assessment of the scholarly content and subject matter of the podcast, special consideration should be given to the needs stemming from the specificities of the

audio form. For example, as mentioned above, the language of podcasts is expected to be more 'conversational' and less formal than that of written text (even if the topic is of high scholarly value).

- » Podcasts should also be engaging so the quality of presenting an issue to non-specialist audiences needs to be taken into consideration.
- » Podcasts should be citable and accessible and therefore stored in a repository.
- » Ensure the highest possible quality of recording and editing.

Further reading

BC Studies. (2023). *Scholarly Podcasts | BC Studies*. <https://bcstudies.com/resources/scholarly-podcasts/>

Copeland, S., & McGregor, H. (2021). *A Guide to Academic Podcasting*. <https://scholars.wlu.ca/books/2/>

Świetlik, M., & Błaszczńska, M. (2023). *The Sound(s) of Open Science*. OPERAS Innovation Lab, August. Retrieved from <https://lab.operas-eu.org/2023/08/11/the-sounds-of-open-science/>

Conclusion

The wide range of outputs discussed in this report is diverse and complex, proving that there is already a vast field of non-traditional scholarly work that needs to be acknowledged and standardised. Moreover, this list will keep growing as researchers seek new formats to communicate their results that could better fit their aims and allow for desired impacts. That means that the humanities need to be more broad-minded about recognising the potential and value of new forms of research output.

This report argues that the catalogue of good research practices in the humanities has grown exponentially. We call for the recognition of novel outputs as valid scholarly work that needs to be properly and rigorously created (using standards and best practices), evaluated (applying relevant evaluation criteria), and rewarded (transforming research assessment frameworks).

In this report, we sought to address numerous challenges, such as considering different evaluation scenarios for different outputs, standardising collaborative research and authorship, assessing the impact of non-traditional outputs, or providing clear criteria for reviewers, to name just a few. This short discussion does not solve all the issues explored here but rather paves the way for reflection and deliberation within institutions, scholarly associations, science policy circles, and the CoARA community. Nevertheless, it seeks to initiate a dialogue that will ideally lead to the improvement of innovative outputs in humanities research and their broader recognition



About this Report

This ALLEA statement has been prepared by the ALLEA Working Group E-Humanities. Through its Working and Expert Groups, ALLEA provides input on behalf of European academies to pressing societal, scientific, and science-policy debates, and their underlying legislations. With its work, ALLEA seeks to ensure that science and research in Europe can excel and serve the interests of society. Read more about the ALLEA Working Group E-Humanities and its members: <https://allea.org/e-humanities/>.

Public Consultation

Between June and July 2023, this report was subject to consultation open to all researchers and practitioners working in disciplines within the humanities, policymakers, and representatives of all public and private organisations active in the field. Over the course of two months, 28 readers left 78 comments and suggested over 200 changes in the document. The feedback ranged from clarification (pointing out the parts in need of elaboration) to providing additional readings and context, as well as entering into discussion with claims made by the authors. This form of community validation proved extremely valuable as all the comments were carefully considered by the authors in the preparation of the final draft, enriching the document. All non-anonymous feedback providers are listed as contributors to this report.

About ALLEA

ALLEA is the European Federation of Academies of Sciences and Humanities, representing more than 50 academies from about 40 EU and non-EU countries. Since its foundation in 1994, ALLEA speaks out on behalf of its members on European and international stages, promotes science as a global public good, and facilitates scientific collaboration across borders and disciplines.

Academies are self-governing bodies of distinguished scientists drawn from all fields of scholarly inquiry. They contain a unique human resource of intellectual excellence, experience and multidisciplinary knowledge dedicated to the advancement of science and scholarship in Europe and the world.

Jointly with its members, ALLEA seeks to improve the conditions for research, to provide the best independent and interdisciplinary science advice available, and to strengthen the role of science in society. In doing so, ALLEA channels the expertise of European academies for the benefit of the research community, decision-makers and the public. Outputs include science-based advice in response to societally relevant topics, as well as activities to encourage scientific cooperation, scientific reasoning and values through public engagement.

ALLEA is constituted as a non-for-profit association and remains fully independent from political, religious, commercial, or ideological interests.





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