Abstract  This contribution reflects on the value of plurality in the ‘network with a thousand entrances’ suggested by McCarty (http://goo.gl/H3HAfs), and others, in association with approaching time-honoured annotative and commentary practices of much-engaged texts. The question is how this approach aligns with tensions, today, surrounding the multiplicity of endeavour associated with modeling practices of annotation by practitioners of the digital humanities. Our work, hence, surveys annotative practice across its reflection in contemporary praxis, from the MIT annotation studio whitepaper (http://goo.gl/8NBdnf) through the work of the Open Annotation Collaboration (http://www.openannotation.org), and manifest in multiple tools facilitating annotation across the web up to and including widespread application in social knowledge creation suites like Wikipedia https://en.wikipedia.org/wiki/Web annotation)

Keywords: annotative practices, semantic web practices, reader-reader interaction, annotation tools, social annotation, folksonomy, content modelling, process modelling

Annotation is one of the important ‘primitive’ activities that scholars in many disciplines employ when they pursue a topic of interest [Unsworth 2000]. As more and more of the scholarly process has been enhanced by,
and in some cases migrated to, digital formats the need to create tools that permit scholars to enjoy the same broad range of primitive activities that they do with physical formats has become evident. This is especially true of the annotation primitive.2

A long-standing and central scholarly practice, annotation is a function of sustained intellectual engagement. Historically, this engagement has occurred with material information via inscription, varying over time with available technologies and practices sustained by them. With reference to one particular type of annotative activity, commentary in electronic form, Willard McCarty encourages scholars to consider the intricate complexity we engage and embody through this practice. In his ‘A Network with a Thousand Entrances: Commentary in an Electronic Age?’ he asserts that annotation ‘fundamentally refers but not necessarily or in any simple way defers to its object. It directs our attention elsewhere, but as governor of our thinking brings attention back. It leads by following, filtering, shaping.’3 Further meditating on recent work that models this activity using electronic tools, McCarty argues that computational methods significantly increase or improve ‘[t]his dynamic, performative aspect of commentary’4, regardless of criticism that computational approaches can be too constructivist and can reduce the human complexity of annotation activities to sheer mechanical processes.5 Annotation, in this view, provides a network with a thousand entrances to individual works, as well as from those individual works to entire, interconnected fields of inquiry—ultimately both bringing the reader toward the object of their contemplation, by facilitating and representing a deeper engagement with the material, and taking them away from the material at hand by pointing to the larger world of ideas, themes, contexts, interactions, and personalities that inform the work. Understanding the complexity and plurality that annotation facilitates is difficult, and modeling it computationally, with an attention to such functionality, may be even more challenging. In this context, our contribution surveys a number of exemplary instances of annotation as a foundation to understanding contemporary work on annotative practices, including from a perspective of methodological research, as well as from a perspective of prototyping or tool building. We consider these perspectives further in the accompanying annotated bibliography.

EXEMPLARY INSTANCES OF ANNOTATIVE PRACTICE

In approaching the conceptual and pragmatic challenges of annotation via practice, the past provides fertile ground for consideration. A typical touchstone in such instances is found in the early biblical commentaries. Witness, for example, work originating in the scriptorium of Peter Lombard, Bishop of Paris, which illustrates complex, interwoven annotative commentary associated with the Epistles (see Fig. 1). In a method that also serves as a recognisable foundation
for certain types of contemporary scholarly editions, extensive commentary is arranged to surround one small section of one epistle. The formal considerations of the page mimic and augment, visually, aspects of the intellectual engagement by those whose expertise is rendered in the centre section of the work. Notable, too, is the visual assistant to aid in navigation of the annotative material; this composite authorial form is provided by a line that runs almost the full vertical length of the inscribed page’s right-hand side, from head to feet of the human
representation. At times, this device has indications relating original text to the intellectual originators of the commentary’s annotation (Jerome, Augustine, Ambrose) that provides the context for the reader’s consideration. The aligned visual image both identifies originators of those providing this external context, and suggests the composite, corporal nature of commentary in relation to the central author’s body of work. The visualised body represents the composite sum of its constituent, intellectual parts. As this example demonstrates, tradition has deemed that ancillary material is essential to reach a comprehensive understanding of the original text.

More organic and less immediately evident practices are found in coterie manuscript culture, another common example in consideration of earlier annotation practices. Fig. 2 presents two facing pages (58v–59r) in the Devonshire Manuscript (BL Add Ms 17492)⁶, a verse miscellany from the c.1530 notable for being the earliest sustained example in the English tradition of men and women writing together in a community. The Devonshire Manuscript is also noteworthy in terms of contemporary popular currency; scholars have referred to this manuscript’s analogic function as ‘the Facebook of the Tudor court’⁷. Across the several non-professional hands and varied written media evident on the page, we readily witness poems arranged with some instances of typical marginal-style notation. With deeper, academically informed attention we might notice that the poetry itself is a mix of original and transcribed
extant lyrics. Moreover, we might note that the writing is at times deliberately adapted poetic utterance, arranged by the manuscript’s several compilers to be conversant with one another in an ongoing epistolary-style conversation among the manuscript’s contributors, with considerable topical reference in the poetic interplay. Some of these discursive events are more obvious, such as in ‘my hart ys set not to remove’, a poem in Margaret Douglas’s hand that references her unauthorised engagement with Thomas Howard. Others appear to reference specific events pertinent to the activities of the coterie that produced the manuscript’s contents, and appear vague to us today; for example, ‘Sum summ say I love sum say I moke’ contains a poetic riddle, hinging on the location in which the speaker’s shoe ‘grew’, or revealed, him. Marginalia and poetic utterance (transcribed and original) take us to and from other points in the manuscript, to other extant and deliberately variant poetic versions, and into the personal, political lives of the prominent figures documented by the manuscript.

Beyond touchstones in manuscript culture, one might look to the markings and textual engagements of beat poet Allen Ginsberg’s annotated copy of modernist T. S. Eliot’s *The Waste Land* (see Fig. 3). Ginsberg’s annotations can also be considered alongside with TouchPress’s *The WasteLand for iPad* (2012), and its facsimile images of T. S. Eliot’s *The Waste Land* from the 1971 edition, marked up with Eliot, Valerie Eliot, and Ezra Pound’s annotations (see Fig. 4).

Further examples of such practices include editions built on Bob Stein and the Institute for the Future of the Book’s SocialBook platform, like Stephen Duncombe’s edition of Thomas More’s *Utopia* (see Fig. 5). This modeling of annotative practices has an onscreen rendering that reflects the page and typical page-based processes familiarly. At the same time, due to its annotation format, which is akin to many social media platforms, the material is open to both an individual reader and to the masses.

Another notable example is Amanda Visconti’s project *Infinite Ulysses*, where readers can annotate passages from James Joyce’s infamous modernist novel *Ulysses* (1922), as well as read through other users’ annotations, and customise annotation filters (see Fig. 6).

Needless to say, although the media have changed radically from twelfth century scriptoria to twenty-first century digital editions, the impulse of engagement remains the same. Whether scribbled on parchment or encoded online, readers annotate their reading material in order to deepen their experience with the work at hand, as well as to situate it in a larger context.

**CURRENT ENGAGEMENT, PARTICULARLY IN THE DIGITAL HUMANITIES**

Such impulses are shared today by those who intersect computational method and humanistic endeavor to the end of reproducing annotation electronically.
Figure 3. Allen Ginsberg’s copy of T. S. Eliot’s *The Waste Land* (AC95.G4351.Zz936e); sources: Houghton Library, Harvard University, and Ginsberg Estate.
Exemplary instances abound, beginning with Wikipedia, which can be considered as an annotative meta-example (see, for example, entries on ‘annotation’ [https://en.wikipedia.org/wiki/Annotation] and ‘web annotation’ [https://en.wikipedia.org/wiki/Web_annotation]), as well as the work of the MIT Annotation Studio, which provides a tool to encourage students ‘to become more aware of the “act of reading” by making reading and annotating a
Figure 5. The Social Book edition of Thomas More’s *Utopia*, source: Open Utopia / Stephen Duncombe.
transparent and shared process’\textsuperscript{10}. One might also look to the foundational strides of the Open Annotation Collaboration (http://www.openannotation.org) and its subsequent working groups, which ultimately provide a data model, vocabulary, and protocol for work in the area, as well as the subsequent W3C proposed recommendations (January 2017). In this context, the contribution of the digital humanist is to understand the ways in which knowledge is represented, analysed, and disseminated, underpinned by processes of content modeling (how we digitise and represent our data in digital form) and process modeling (how we engage that data). There is a considerable body of work in this vein, quickly growing and evolving.

With the aim of providing navigational entry points to the abundance of recent and current work on annotation, we present briefly here—and at greater length in this piece’s aligned annotated bibliography—a survey of engagements in the area from the perspective of the digital humanities. Much of this work explores what McCarty deems the dynamic and performative elements of annotation enabled by computing\textsuperscript{11}, and it is often informed by the richness of annotation’s long history. In applied and experimental computational contexts, explorations arise from the perspective of simulating, modeling, and prototyping in a larger framework of facilitating evolving user needs. This process itself requires critical inquiry, as well as clear definition and categorization of annotative practices.\textsuperscript{12} Some initiatives adopt a survey-and-report format by scanning

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure6.png}
\caption{Infinite Ulysses edition of James Joyce’s Ulysses; source: Modernist Versions Project / Patrick Belk, Matthew Kochis, and Amanda Visconti.}
\end{figure}
models, tools, and relevant, critical research in the field. Others explore areas of possible application, including collaborative annotation and folksonomy tagging approaches, as seen in collaborative digital scholarly editing. Key high-level issues include annotation organization, management, and retrieval; creating optimal knowledge management support systems; shifting to the semantic web as a space for creating, organizing, and retrieving annotations; data interoperability and data appropriation; and the creation and maintenance of flexible annotation systems that support a variety of formats.

The understanding of textual annotation exemplified in Stein’s SocialBook remains a mainstay in thinking on this topic and is manifest in both ‘thought experiment’ prototypes and production tools that model, extend, and sometimes radically augment the practices of the past. Research that situates annotation in the field of digital humanities focuses on defining annotation practices and theories, as well as specifying frameworks for commentary across media (e.g., paper and screen), or engaging broadly with annotation platforms that better support user interaction with objects and with each other. There is consensus that the evolution of scholarship brought about by interactive Web 2.0 practices has shifted emphasis from reader-content interaction to reader-reader interaction (often rendered as ‘learner-content’ to ‘learner-learner’), and that this behavioural shift necessitates a redesign of tools. Many digital humanists acknowledge that annotation practices carry forth a benefit for learning, archiving, clarifying, sharing, and expanding; at the same time, however, there is a struggle to provide full, proper facility to these ends, particularly because of limitations in current Web architecture. In spite of such limitations, a number of tools bridge the gap between design and user needs, including AnnotatEd, CommentPress, and Hypothes.is. Such tools, along with alternative platforms that experiment with gamification and annotation, allow for interactive reading and support user engagement with resources in a customizable way, treating documents as mutable objects that can be tagged, highlighted, and underlined. Tools such as Annotary and Annotea facilitate bookmarking and the organization of documents, thereby making searching and browsing through data easier and more efficient. Many of these tools are free to use, as the majority are online and open access, which allows users to share their own data and have access to each other’s annotations, in turn promoting collaboration.

As in the past, text is not the only form of data annotated currently. Today, there are a variety of approaches to annotation across textual and non-textual media, ranging from manual and semi-automated techniques to completely automated practices (Axiom; Greenshot; Madcow). Resources and tools to this end consist of open access annotation tools and other praxis-oriented academic work (Annotea; NewRadial). Working across structured or unstructured data, this work has a strong emphasis on the use of controlled ontologies, collaborative practices, and the dissemination, exchange, and
reuse of annotations across media types. Some practitioners are concerned with interface design for media annotation, in particular. This includes the development of appropriate and up-to-date interfaces and navigation techniques that reflect evolving annotation practices, as well as accommodating the needs of various types of users in environments ranging from the classroom to interactive museum annotation systems. Other issues of note concern the relationship between collaborative practices and tool/data-type interoperability, specifically in research that highlights and proposes solutions to the limitations of current tools’ support of annotation across different mediums and formats.

With regard to non-textual media, the retrieval of annotation information holds considerable challenges related to data type. More recently, the dramatic increase in the volume of data has required address, and semantic web practices appear to be a viable solution to this challenge, as they have the potential to interlink data (and thereby annotations) more dynamically than standard web practices currently can.

In current work, there is significant emphasis on the critical thinking and research practices of group dynamics and social interaction in the space of digital annotation. Researchers interrogate how Web 2.0 practices have changed the way information is stored, accessed, and interacted with, and note that the movement toward participatory practice has resulted in a gap between our theoretical understanding and how it manifests in prototypes and tools. In exploring various functionalities of annotation software that assist in building community and facilitating virtual collaboration (as is facilitated through Google Drive), themes of community engagement, creation, sharing, comprehension, and learning outside the classroom arise. Case studies such as Diigo (a web annotation plug-in), He Do the Police in Different Voices (a digital annotation project), and NewRadial (an Implementing New Knowledge Environments [INKE] annotation and networking tool) illustrate that social annotation practices can take place across a variety of platforms intended for a multitude of scholarly or personal endeavours.

In terms of underlying bibliographic reference, metadata, and tagging/encoding concerns, one finds many approaches and tools that facilitate tagging and annotation of documents and websites, and the creation of various types of metadata (Bibsonomy; Qiqqa). Resources range from selected case studies that discuss and evaluate the features of the tools at hand, and publication-based investigation of bibliographic referencing issues, including domain ontologies, bookmarking, automatic annotation, and search queries. Michael G. Noll and Christoph Meinel further identify three types of metadata that affect social bookmarking: social annotations, anchor text, and search queries. As a practice, bibliographic metadata annotation is growing alongside the proliferation of digital work in the humanities, especially with the increasing interest in digitizing books—yielding varied and new types of data and
metadata that need to be annotated and organised for utility. It also extends to include the bibliographic tagging of websites and web pages (*Delicious*; *Flickr*; *Pinterest*) and points to available tools that allow users to semantically annotate resources (*CAT*; *Pundit*). Electronic tagging is considered a central practice since folksonomies have a remarkable effect on user/web interaction. Relational data and automatic linking are also seeing increased consideration as a means for information extraction and processing.\(^3\)

**CONCLUSION: AN ENTRY INTO CURRENT RESEARCH IN ANNOTATION**

Current work to understand and engage in annotation offers its own network with a thousand entrances. Annotation research is now typified by a broadening of pertinent perspectives and approaches, as well as a rapidly growing body of knowledge, and an increasing set of iteratively evolving developmental prototypes and tools. Our survey, here, briefly engages the richness of contemporary pursuit in this vein. We consider the resources included to represent larger, interconnected areas of inquiry in themselves, which are further engaged in the accompanying annotated bibliography. Looking forward, we anticipate that the increase in technological skill and inquiry, coupled with massive data generation, will result in a network of information and annotations that encompass many more than a thousand entrances.

**ACKNOWLEDGMENTS**

We would like to thank the various archives and libraries for granting us permission to reproduce images of rare materials that so clearly demonstrate the sociality of print. We would also like to thank our anonymous reviewers at IJHAC for their suggested resources and cogent feedback.

**END NOTES**

1 This survey article is available with its complete annotated bibliography via the publisher’s website at [www.euppublishing.com/toc/ijhac/11/2](http://www.euppublishing.com/toc/ijhac/11/2). See also the appendix to this article.


4 See McCarty, ‘Network’, 363.


8 *The Devonshire MS* (ff. 58v–59r)
The Value of Plurality

11. See McCarty, ‘Network’.
Ray Siemens et al.


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APPENDIX

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The Value of Plurality


BIBLIOGRAPHY OF TOOLS


The Value of Plurality


1. The primary goal of the EUP Journals Blog

To aid discovery of authors, articles, research, multimedia and reviews published in Journals, and as a consequence contribute to increasing traffic, usage and citations of journal content.

2. Audience

Blog posts are written for an educated, popular and academic audience within EUP Journals’ publishing fields.

3. Content criteria - your ideas for posts

We prioritize posts that will feature highly in search rankings, that are shareable and that will drive readers to your article on the EUP site.

4. Word count, style, and formatting

- Flexible length, however typical posts range 70-600 words.
- Related images and media files are encouraged.
- No heavy restrictions to the style or format of the post, but it should best reflect the content and topic discussed.

5. Linking policy

- Links to external blogs and websites that are related to the author, subject matter and to EUP publishing fields are encouraged, e.g. to related blog posts

6. Submit your post

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If you’d like to be a regular contributor, then we can set you up as an author so you can create, edit, publish, and delete your own posts, as well as upload files and images.

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Posts may be re-used and re-purposed on other websites and blogs, but a minimum 2 week waiting period is suggested, and an acknowledgement and link to the original post on the EUP blog is requested.

8. Items to accompany post

- A short biography (ideally 25 words or less, but up to 40 words)
- A photo/headshot image of the author(s) if possible.
- Any relevant, thematic images or accompanying media (podcasts, video, graphics and photographs), provided copyright and permission to republish has been obtained.
- Files should be high resolution and a maximum of 1GB
- Permitted file types: .jpg, jpeg, png, gif, pdf, doc, ppt, odt, pptx, docx, pps, ppsx, xls, xlsx, key, mp3, m4a, wav, ogg, zip, ogv, mp4, m4v, mov, wmv, avi, mpg, 3gp, 3g2.