Annotation Studio

Digital Annotation as an Educational Approach in the Humanities and Arts

White Paper

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> "… when I give them tasks that require the use of Annotation Studio, and when I tell them that as they complete these tasks they are working as editors, scholars, and critics, something remarkable happens. They become better readers and writers."
>
> (Wyn Kelley, Senior Lecturer in Literature, MIT)

Introduction

The simple, intuitive practice of textual annotation, when carried out in a networked environment, offers a surprising variety of new approaches to the humanist educator and student, while also opening up unique possibilities for pedagogical peer production and sharing. Annotation activities can give rise to a networked educational commons by taking advantage of what Burdick and her collaborators refer to as the "fluid textualities that rely on the affordances of digital environments."[1] Educational annotation approaches the activity of developing marginal commentary on source texts and other media less as a formal means of explicating those texts for other readers[2] than as an informal educational means of promoting a learner's engagement with, and comprehension and assimilation of, texts. There are, however, no necessary barriers between the two, which have lengthy and intermingling traditions.[3]

Annotation Studio is a web application designed in HyperStudio, MIT's digital humanities laboratory, to make the educational annotation of digital texts and other media easily and freely available to scholars, classroom instructors and students. Developed with support from the National Endowment for the Humanities and drawing from resources available in open source, the application places special educational emphasis on the digital humanities goal of using digital media to expand the possibilities of engaging with texts in the humanities and arts. "With the migration of cultural materials into networked environments," Burdick and her collaborators have remarked, "questions regarding the production, availability, validity, and stewardship of these materials present new challenges and opportunities."[4] Annotation Studio addresses these challenges and possibilities through the longstanding humanistic practice of marginal commentary, in an easy-to-use networked environment that supports the classroom curation of digital texts, individual and group marginal commentary on those texts, and a variety of educational activities devoted to the critical and aesthetic engagement with the texts.

One of the widely acknowledged characteristics of annotation is its synthetic yet transitional nature.[5] Traditionally practiced as "part of the routine of learning," often with special emphasis on strengthening the reader's memory, annotation's blend of reading and writing reflects what Jackson has called "the natural tension between author and reader" — even in the slightest markings and interventions.[6] While annotation takes place in the margins of established content, it also implies a challenge to that same content.[7] This spatial marginality can be conceptually generative and reflect the tentative, transitional

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[1] Anne Burdick, et al. *Digital_Humanities* (Cambridge, MA: MIT Press, 2012) 30.

[2] Formal literary annotation for readers is examined in Claire Lamont, "Annotating a Text: Literary Theory and Electronic Hypertext," *Electronic Text: Investigations in Method and Theory*, ed. Kathryn Sutherland (New York: Oxford UP, 1997) 47-66.

[3] Many traditions of annotation are explored in Stephen A. Barney, ed. *Annotation and Its Texts* (New York: Oxford UP, 1991).

[4] *Digital_Humanities*, 3.

[5] H. J. Jackson, *Marginalia: Readers Writing in Books* (New Haven: Yale UP, 2001) 90.

[6] *Marginalia,* 87, 90. See also William H. Sherman, "What Did Renaissance Readers Write in Their Books?" *Books and Readers in Early Modern England*, ed. Jennifer Anderson and Elizabeth Sauer (Philadelphia: Univ. of Pennsylvania Press, 2002) 121.

[7] *Marginalia*, 90. On the agonistic character of annotation, see also Ralph Hanna III, "Annotation as Social Practice," *Annotation and Its Texts*, ed. Stephen A. Barney (New York: Oxford University Press, 1991) 178-79, 81.

forming, the liminality, associated with learning: the development of fresh insights, the building of new relationships and the formation of new identities.[8] "A marked or annotated book," Jackson notes, "traces the development of the reader's self-definition in and by relation to the text."[9] Andrew Piper, in his exploration of the history of the miscellany and other reading in the romantic period, has explored at length ways in which typographical "hollows" or empty spaces, invited inscriptions and marginal commentary, bringing writing and print into "intimate contact."[10] The "invitation to handwriting" offered by space on the page, Piper notes, served "as a kind of initiation into a way of thinking about writing more generally within the printed public sphere as a space of commonality."[11] Although digital annotation is no longer in script, it still merges author with reader and shares with handwriting the quality of textual fluidity in the margins. Annotation Studio supports these two ideas that the activity of annotation is constitutive of (1) a liminal, transitional learning space that is also part of (2) a printed public sphere or commons. The commons, as Benkler has discussed at length, has taken shape through the free software movement and ubiquitous computer communications networks, which educational users of Annotation Studio have taken advantage of.[12] As a networked application, Annotation Studio, we will show below, advances the "social life of the humanities" by encouraging a new participatory approach within the humanities classroom itself, as well the emergence of a broader educational commons in which it is shared freely across national and international educational levels, institutions and disciplines.[13]

From Start-Up to Implementation

Annotation Studio is grounded in the contemporary search for innovative ways to engage students in a classroom community of learning that crosses the divide between digitally-enabled and traditional pedagogies.[14] For humanists, reading and writing in networked classroom environments have emerged in the context of a rapidly expanding body of easily accessed multimedia content in the humanities and arts that would have been unimaginable a generation ago. Gaining access to and managing these materials in the contemporary classroom requires a new means of classroom content curation; in turn, digital affordances associated with the rise of Web 2.0 as an authoring and collaborative medium have enabled a variety of pedagogical innovations for engaging with these materials. As Jenkins and Kelly and others have observed, students themselves are able network users, with existing skills that are eminently adaptable to the aspirations of the humanities in a digitally supported classroom.[15] The seed of Annotation Studio took root in this emerging educational environment in an early collaboration between Dr. Wyn Kelley, an MIT Americanist and Melville scholar; Co-PI Fendt, a scholar of Digital

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[8] Alison Cook-Sather explores liminality and learning in fluid textualities in her study, "Newly Betwixt and Between: Revising Liminality in the Context of a Teacher Preparation Program," *Anthropology and Education Quarterly* 37.2 (2006): 110-27.

[9] *Marginalia*, 87.

[10] Andrew Piper, *Dreaming in Books: The Making of the Bibliographic Imagination in the Romantic Age* (Chicago: U of Chicago Press, 2009) 138.

[11] *Dreaming*, 128.

[12] Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale UP, 2006) 59-68.

[13] *Digital_Humanities*, 84.

[14] See, for example, Henry Jenkins and Wyn Kelly, eds. *Reading in a Participatory Culture: Remixing Moby-Dick in the English Classroom* (NY: Teacher's College Press, 2013). See also Henry Jenkins, et al., *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century* (Cambridge, MA: MIT Press, 2009).

[15] *Reading*, 5-9. See also John Palfrey and Urs Gasser, "Learners," *Born Digital: Understanding the First Generation of Digital Natives* (New York: Basic Books, 2008) 237-53.

Humanities and cultural studies; and the HyperStudio staff around Kelley's proposition that students might well improve their capabilities as individual and collaborative readers and scholars by adopting the longstanding humanistic practice of writing marginal commentary in books using a digitally-enabled, hypertextual space laterally linked to the main source text.[16] The resulting annotation processes opened up a rich variety of pedagogical approaches around what Kelly has referred to as "getting off the linear path of reading and wandering in the open spaces of the margins," imitative of Herman Melville's own annotative assimilating of his reading[17]

Annotation Studio, as it has been co-designed, built and implemented by classroom instructors and HyperStudio staff over more than five years, has centered on undergraduate classroom use and developed functionalities that promote core humanities skills, including close reading, interpretation, argumentation and writing. Over time, the spaces of Annotation Studio have increasingly been seen as transitional and integrative, helping students turn insights inspired by close reading into arguments based on evidence derived from primary humanities documents in a variety of media formats.

The prototype of Annotation Studio created under a NEH Digital Start-Up grant attracted around 300 users, faculty and students in the humanities and arts, inside and outside of MIT who provided valuable feedback for feature design and development, pedagogical use and curriculum integration. From the start, our testing environment has been the classroom, and our measures of success (other than ease of use) have been defined by educational outcomes, outside institutional adoption, and the internal and external growth of a user base. Concurrent classroom integration has been critical to the iterative development process of Annotation Studio and bi-weekly pedagogy meetings with participating instructors have supported the design and development of new teaching and learning practices from the outset.

From the start of the Implementation Grant in the fall of 2013 the project's expanding network of users has exceeded our expectations (see Appendix 5), revealing what we consider to be a broad level of support for our design and educational priorities, but also an enthusiasm for the peer sharing approach of an educational commons, as well as a core student and instructor interest in the participatory dynamic of a classroom engagement in the context of Web affordances. With more than 7000 registered users from more than 800 educational institutions ranging across high schools, community colleges, and four-year universities from the US and abroad, the project activities during this Implementation Grant period have been focused considerably on the processes of supporting the scaling up of a digital humanities application that has generated so much outside interest. Within two years, Annotation Studio has seen a significant uptake in humanities education around the world, partly due, we think, to Annotation Studio's ease-of-use design and the project's outreach activities such as a major new project website, workshops, webinars, and conference presentations. Further user base expansion has no doubt been the result of word of mouth, reviews by existing users, and lesson plans by instructors posted on the project website and in instructors' blogs, as well as the fact that Annotation Studio is free to use and the code open source. Admittedly, as a small team of local scholars, educators and developers, we have not had the resources to explore, other than anecdotally, the reasons behind the spread of interest, or, indeed, what the full range and nature of use cases might be.

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[16] Dr. Kelley's experiences with annotation in the classroom are discussed in more detail in Appendix 4, below.

[17] *Reading*, 101.

Annotation Studio's Core Design

Annotation Studio's distinctiveness results from a combination of its easy-to-use, transparent functionality, its open source grounding, and its agile development process as a classroom-generated educational tool. These qualities and processes support a core functionality (see Box 1) that has emerged from the start in a continuous discussion among educators, students, developers, and designers about what is needed in the classroom and actually works pedagogically. Each item on the list has been discussed for its feasibility, educational value and cost. The Annotation Studio team has been committed to an agile methodology in building its application on the best available open-source tools – most prominently The Annotator by the Open Knowledge foundation – and used code contributed by other open source developers at Hofstra University and Harvard University, while continuing to build its own code base and occasionally employing outside design and code support from commercial organizations like Thoughtbot.com and Performant Software.

Co-designing with students and instructors

The Annotation Studio team follows the HyperStudio principle of co-designing its projects around use environments with a variety of stakeholders and kinds of expertise present. The team is composed of a combination of classroom instructors, designers, and software developers who meet every other week throughout the academic terms, often with student users, to engage in design discussions focused primarily on end users' needs. Regular feedback from students and faculty (within MIT and from outside) using the web application has continuously informed software development and resulted in the core functionality listed in Box 1.

With feedback from a growing number of educators and students relying on the application, our design

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Box 1: Core functionality

- Text of any length can be annotated.
- Texts in a variety of formats can be uploaded.
- Application supports user-generated source texts.
- Users can annotate collaboratively.
- Users can create user groups with user selected privacy settings.
- Online media documents can be added to annotations.
- Static and dynamic media can be integrated in texts.
- Annotated texts can be linked to media documents, source materials, and adaptations.
- Text and associated annotations can be tagged using folksonomies and predefined categories.
- Annotations can be sorted in a variety of ways, including tags, categories, privacy, or group affiliation.
- Annotations can be used in other applications
- A dashboard gives quick access to documents, annotations, and group affiliations.
- Documents support standard Dublin Core-based metadata.
- Documents can be made private, shared, or public depending on copyright status. The application can be used freely on the public site, in institution-specific subdomains, or as a separate open-source installation from Github.

See exhibits in Appendix 1 for application screen illustrations.

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optimization of the core functionality tended to take priority over expanding the number of advanced features built into the application. With a growing base of users, we felt a growing commitment to delivering them easy-to-use and pedagogically tested functionalities. Any new functionalities needed to be built and tested much more rigorously than they might be in an experimental prototype, partly because meeting the needs of thousands of users had to succeed without overburdening the

HyperStudio team with additional support requests. We focused on features that supported pedagogical uses across a broad range of humanities courses ranging from literature and foreign languages to creative writing and media studies in secondary and tertiary educational institutions. This focused co-design approach on the humanities classroom and supporting a range of pedagogies in learning communities, we feel, sets our application apart from other annotation tools.


Basic Functionality from the User's Point of View

Annotation Studio has been designed to make it easy for a first-time instructor user to register, log in, create a course identifier and start loading texts; or, for a first-time student user to register, log in, enter the course identifier, and start reading and annotating course texts. The goal has been simplicity in user interface design, easy access to basic levels of use, and modal access to more advanced functionality. The design goal has also been to enable flexibility in educational use, so that the web application may support multiple pedagogical scenarios in a variety of humanities disciplines and the arts, and also support educational levels from secondary to advanced university.

Registering for Annotation Studio. To get started with the public version of Annotation Studio, a user would register at: http://app.annotationstudio.org. After agreeing to the Terms and Conditions, the instructor, student or other user receives a registration email. After confirming the registration email, the user can log in. (See Appendix 1 for a series of exhibits that captures the core functionality of Annotation Studio.)

Working from the dashboard. The main page a user sees after logging in is the Dashboard (Exhibit 3, Appendix 1). The Dashboard provides quick access to documents, annotations, and classes or groups a user is part of. The Dashboard is also the location from which the user would select "create new document" to go to the Document Upload and Editing Panel (Exhibit 4, Appendix 1) in order to upload a new text for a class or group of users to read and annotate. On the public Annotation Studio site, a user is automatically put into the "public" group, which gives access to a number of public domain texts that can be freely annotated in the main annotation page. (Exhibit 3, Appendix 1).

Annotating a text. In order to make an annotation, a user selects a text from the dashboard, and when it appears on the Main Annotation Page, begins reading and annotating. (Exhibit 2, Appendix 1). To create an annotation, the user highlights a portion of the text in the Main Annotation Page, clicks on the floating annotation window that appears, and adds a comment (see image at right). The comment must be saved by clicking on the "save" button at the bottom of the window. The comment can be enriched with Web links, embedded images, sounds, and videos available on the Web. In addition, the user can add her own tags and share the annotation with fellow users in the same group or class. Groups are smaller working sub-groups within larger classes. They can be created in a user's profile page (see Exhibit 8, Appendix 1).
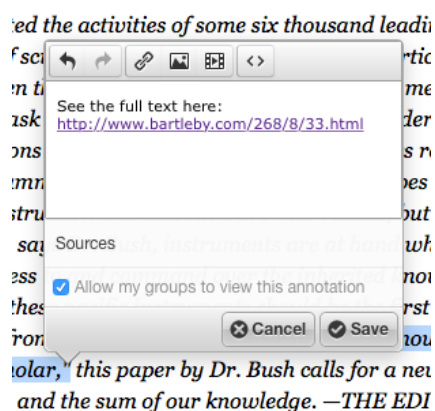
Uploading documents and other media. If an instructor, student or other user wants to upload her own documents, she would go to the Document Upload and Editing Panel (Exhibit 4, Appendix 1). This panel can be accessed from the Dashboard by clicking on "create new document." The user can either upload

an existing simple MS-Word or PDF file, or paste HTML text directly into the text form/box. Standard metadata fields allow the user to add bibliographic information. A document can have three states:

- Draft (text can still be edited)
- Published (text can be annotated but no longer edited)
- Public (text and annotations can be viewed without registration but no annotations can be made)
- Archived (text longer shows up in a user's dashboard)

Assigning texts to classes and groups. A newly uploaded text can be assigned to one or more classes or reading sub-groups in the Document Upload and Editing Panel Exhibit 4, Appendix 1). The uploader simply adds a new class or sub-group name (i.e. identifier) under *Classes* or *Groups*. The document is then shared with this new class or group. A user can add the new class or group identifier under her user profile (see Exhibit 8, Appendix 1) to join the class or group and access and annotate this document.

Managing annotations. In addition to adding new annotations in the Main Annotation Page, users can also view all annotations on a particular text in the annotation side bar, seen in the Annotation Screen with Filtering Options (Exhibit 5, Appendix 1). This filtering panel is activated by clicking on the gear button at the top of the Main Annotation Page. The side bar supports the filtering of annotations according to the following criteria:

- Who made the annotation (user, group members or class members)?
- Where annotations appear in the text (visible portion of the text or whole text)
- How they are tagged (user-created tags)

With these basic operations, Annotation Studio may be used in an endless variety of educational and classroom settings, levels, and domains. The growing community of users has made use of these functionalities in innovative ways, some of which are summarized in Appendices 3 and 4. For further details on the functionality of Annotation Studio, see the screenshots in Appendix 1 or go to the informational website at http://www.annotationstudio.org/ to consult the user's manual and usage videos. Or, simply try out the application at http://app.annotationstudio.org.

Use of the Knowledge Commons: Open Source Technologies

In considering how best to build the proposed annotation application, we surveyed the field of available open source software related to our project and discovered that the Open Knowledge Foundation's *Annotator* included a core set of features that supported and complemented what we proposed to develop. By choosing to build on the Annotator's strengths rather than creating all of the proposed features from scratch, we took advantage of the shared resources of the Open Knowledge commons and significantly accelerated software development, which allowed us to focus on distinctive needs associated with using annotations in an educational context. Accelerating software development also enabled us to invest more of our limited resources to working with faculty users to tailor the tool and integrate it into their curriculum and instruction. Just as significantly, our decision to incorporate the Open Knowledge Annotator connected us with an international community of developers, theorists, and educators who are actively collaborating to produce a common core of adaptable annotation software and to develop the W3C Open Annotation[18] standard that supports the user's ability to exchange and reuse annotations across tools and platforms.

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[18] http://www.w3.org/annotation/ (March 2016)

The groups with which we have established the strongest connections include:
- Hypothes.is, a nonprofit building an open web annotation tool based on the Annotator
- Harvard University and Massachusetts General Hospital
- The W3C Open Annotation Community Group
- The Open Knowledge foundation, originator of the Annotator, and an organizer of open source software projects for open knowledge.
- The Digital Resource center at Hofstra University

Technical specifications. Annotation Studio is developed as an open source web application, based on state-of-the-art web design and development technologies and methods (see Box 2). Its interface provides users with a web browser-based reading and note-taking workspace written in HTML, CSS, and Javascript. On the server side, the latest Ruby on Rails framework accelerates development and is hosted on Heroku's "Platform as a Service," which enhances and accelerates deployment and scaling.
All Annotation Studio code is available on HyperStudio's GitHub site under a GPL 2 license: https://github.com/hyperstudio/Annotation-Studio.

> **Box 2**: Technical specifications
>
> Annotation Studio's user interface is written in HTML, CSS and Javascript.
>
> - Backbone.js supports user data display and navigation.
> - Twitter Bootstrap and jQuery support user interface controls, layout, and design.
> - All user and group management and document organization is built in Ruby on Rails, integrating existing HyperStudio open source software.
> - Annotation data is stored in the MongoDB database via a RESTful web API written in Node.js, which enables reuse, visualization, and analysis of annotations.
> - The open source Annotator editor is built in Coffeescript/Javascript by the Open Knowledge Foundation. Github and Heroku support collaboration and deployment.

Annotation Studio Development

Over the Implantation Grant period, we released version 2 of Annotation Studio along with three subsequent major updates, incorporating new features requested by classroom users and refinements derived from user feedback. Beyond the previously mentioned upload functionality, Annotation Studio now also features touch capability which has been a priority for many student users and significantly expands the application's usability by allowing users to annotate on tablet-size mobile devices.

Annotation filtering. The management of annotations in the classroom and in educational contexts through various filtering options has been a key area of interest in developing Annotation Studio. Annotation filtering (see Exhibit 5, Appendix 1) was called for and shaped by instructor and student feedback. Current filtering approaches enable users to view annotations based on various levels of group membership, user-created annotation tags, and a new annotation category feature (under development). In addition to the free-form, folksonomy-based tags that any user can invent for annotations, Annotation Studio categories allow instructors to create a set of pre-defined tags that can be used by all students with the documents assigned to a specific class. In this way, annotations can carry both fixed and free-form tags to support structured reading and annotation of documents without

limiting students' ability to organize their comments by using personal tags. Annotation filtering allows students and instructors to share and participate in a variety of reading approaches: to focus on specific class perspectives of the annotated texts, as well as on group and individual reader perspectives. These filters are particularly useful for heavily annotated documents and the fine-grained analysis of reader engagement. They support a structured approach to shared knowledge creation within the classroom and online. We also implemented a new curational status for documents, "Public." Documents collected under Public do not require a login to be read, enabling annotated documents to be viewed by anyone, not just by registered users of Annotation Studio.

Shared Media Repository Concept. In addition to using resources available on the Web, the most recent version of Annotation Studio allows users to integrate texts, images, videos, maps, and other media from a locally stored media repository. This functionality[19] allows instructors and students to develop a shared repository whose materials may be reused by many users across multiple classes and annotations. The functionalities of Annotation Studio may in this way be incorporated into an existing media repository, which would thereby open those materials to classroom and broader educational use. The shared media repository concept, as well as the categories of functionality described above, have been developed in close collaboration with Hofstra University's TextLab project and their Digital Resource Center. Hofstra U. has set up its own Annotation Studio installation which is used in several humanities classes. In addition, their TextLab project (directed by Prof. John Bryant, an Annotation Studio advisor) is currently integrating Annotation Studio as an additional commentary layer.

Multi-tenancy, peer sharing and institutional independence. The multi-tenancy capability we added to the Annotation Studio's architecture is yet another development focused on the application as an educational commons resource. Multi-tenancy enables institutional adopters to create their own university specific subdomains. This approach supports our goal of transferring the application to other institutions, which may now request their own subdomains without having to install their own version of Annotation Studio on their servers. By developing this multi-tenancy approach, we were able to offer an option that users often prefer over installing and hosting their own versions of the application. Since all subdomains share the same codebase and server infrastructure, each subdomain enjoys automatic access to the latest version of Annotation Studio, yet also gains greater security for its home institution. Since we began offering this multi-tenancy feature in the summer of 2014, twenty-three universities and colleges have requested their own subdomains. In a future release, we plan on integrating the LTI standard (Learning Tools Interoperability[20]), allowing educational institutions to integrate Annotation Studio seamlessly into their own, existing LMS (Learning Management Systems).

Usability and Assessment

Annotation Studio's expanding user base encouraged us to place additional emphasis on conducting formal usability testing of the application and an assessment of its pedagogical impact. Usability testing seeks to achieve simplicity and stand-alone robustness, which in turn encourage growth in the user base and thus support the digital humanist's goals of expanding the means of engaging with texts. Equally important, simplicity and robustness are the designer-developer's (i.e. HyperStudio's) defense in the sense that they diminish the level of support required to sustain growth of the application's use

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[19] Currently this functionality integrates with MELCat, a media repository developed in collaboration with Hofstra University, which is available as a per sub-domain configuration. In the fall of 2016, we intend to release this functionality to all users.
[20] http://www.imsglobal.org/toolsinteroperability2.cfm (March 2016)

communities. Drawing on the expertise of MIT's very experienced and well regarded Usability Laboratory, we designed a series of tasks for testers to perform. The usability testing results focused on annotation activities and gave us valuable feedback on how to improve the web application's user interface, functionality, and overall design clarity.

Educational assessment was conducted in close consultation with assessment specialist Andreas Karatsolis, Associate Director of MIT's Writing, Rhetoric, and Professional Communication Program. (For more on assessment, see Appendix 2.) Under his guidance we designed and conducted an extensive program of classroom assessment of Annotation Studio's effectiveness in supporting the reading and interpretation process leading to essay writing. Using surveys, reflective writing pieces, and data collection, Dr. Karatsolis and the HyperStudio staff conducted multiple assessments in writing, literature, and foreign language classes. The goal was to gain more detailed insights into how Annotation Studio functions in an actual classroom and its use by instructors and their students to develop the students' reading and writing skills. These insights lead to refined classroom activities and better curricular integration, as well as a growing body of pedagogical "best practices" the HyperStudio staff has been collecting on its website.[21] (See also Appendices 3 and 4 for additional educational use case evaluations.)

User Support and Outreach

Outreach turned out to be a demanding but affirming turn in the Annotation Studio implementation phase, and we decided early on to support and interact with a much larger (eventually, more than a multiple of 25), more diverse network of users than we had anticipated. (See Appendix 5 for a summary of general user patterns.) Indeed, we raised substantial additional funding to hire an outreach coordinator who would coordinate and implement outreach and support activities. To support this growing user base, we developed a strategy of multiple forms of user instruction. We developed and continually revised a user-oriented website; we created a down-loadable user manual (http://www.annotationstudio.org/wp-content/uploads/2015/01/AnS-Manual-January-2015.pdf); and we filmed a series of short video tutorials (http://www.annotationstudio.org/support/tutorial/) that can be embedded in syllabi.

On our website, we implemented an active user forum (http://support.annotationstudio.org/) in which users could help each other and interact with our developers and the outreach person. In addition, we created so-called case studies in which instructors talk about their specific uses of Annotation Studio, provide lesson plans, and offer insights into the successes (or failures) of the annotation activities. A number of case studies are posted on the Annotation Studio website: http://www.annotationstudio.org/pedagogy/case-studies/

We also conducted three webinars, two for a broader community of instructors both inside and outside of MIT, and one specifically for the HASTAC community.[22] Attendance at each webinar ranged from 40 - 70 participants, and materials (including website links) handed out were undoubtedly shared well

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[21] A detailed account of Dr. Wyn Kelley's work with Annotation Studio in the literature classroom is included in Appendix 4, followed by Dr. Jessica Kubiak's detailed account of her use of the application for developing reading versatility in three English classes at Jamestown Community College. Additional synopses of pedagogical uses of Annotation Studio can be found in Appendix 3.

[22] Video available on HASTAC website: https://www.hastac.org/blogs/hastac-scholars/2015/03/25/video-annotation-studio-classroom-and-research (March 2016)

beyond the attending audiences, which have grown steadily in size over the years of Annotation Studio development.

Two workshops during MIT's Independent Activities Period in January 2014 and 2015 drew groups of 60 instructors each from a broad range of educational institutions from the New England area. While the first workshop was an afternoon event, the second workshop was an all-day event with Advisory Board member John Bryant of Hofstra University as keynote speaker, two panels on Digital Annotation and Reading/Writing, several breakout sessions, and a talk on assessment strategies for online environments by team member Andreas Karatsolis. More information can be found here: http://www.annotationstudio.org/news/

Continuation of the Project

Annotation Studio will continue to have an innovative impact in several ways, we believe, as more and more educators adopt the application into their classroom pedagogies. Its open source, peer sharing approach will continue to make it attractive to educators looking for novel ways of engaging their students in the humanities and arts. It will also continue in the work of initiatives like Hofstra University's Melville Electronic Library, under John Bryant, which is integrating annotation as part of its growing tool set. Annotation Studio has already been adopted by the international US-Iran Relations project, and we expect that more public archival initiatives will adopt the technology. Finally, the Annotation Studio technologies and pedagogies add to the very extensive knowledge base in the Digital Humanities that HyperStudio has been accumulating for two decades and continues to make use of in new research projects and in its ongoing support of education in the humanities and arts at MIT.

Given that many educational users across the globe are now relying on the free availability of Annotation Studio for their curricular work, HyperStudio will assume some level of responsibility for keeping the project going and possibly developing it further through new initiatives. Several functions that we developed are currently in beta stage, and we are committed to finding new resources that will enable us to incorporate them into the next version of the application. At the same time, there are many exciting possibilities for annotation-associated research and development; the HyperStudio project team has already written grant proposals for new collaborations with MIT's Center for International Studies and MIT's college writing program. We are also exploring the incorporation of Annotation Studio capabilities into MIT's developing MITx platform and collaborating with a MIT faculty public archival project in medical history that will integrate Annotation Studio functionality.

We have explored other options ranging from farming Annotation Studio out to a commercial software company or securing modest steady-state internal MIT support, to pursuing new grant opportunities beyond the current focus on annotation. With the increased national interest in digital annotation seen in open tools from initiatives such as hypothes.is, Lacuna Stories, and JSTOR labs, Annotation Studio intends to seek collaborations that would help support and strengthen its educational focus. We are especially interested in the bridge annotation provides between the reading and writing processes, both of which are increasingly well covered by open source projects. The educational commons holds considerable promise for making these and other advances, including multiform annotation, freely available. In addition, we are seeking opportunities to expand the use of Annotation Studio in high schools by teaming up with school districts, teacher organizations, and independent educational organizations. At the same time, we will continue our research into the modalities, concepts, and uses of annotation and help build what we believe is an important emerging Digital Humanities field of

Annotation Studies. On the development side, closer integration of open standards such as WC3's Open Annotation[23] and IMS Global Learning Consortium's LTI standard (Learning Tools Interoperability)[24] will ensure compatibility and interoperability with other, similar tools.

Beyond Annotation: Idea Space

In the Implementation Grant proposal, we aimed at going beyond the strict annotation of documents to further imagine and prototype some of the ways in which instructors and students might use annotation and the networked environment to integrate the reading and writing processes, as the basis for essays or other creative texts. Annotation has much in common with the process of note-taking that typically precedes academic writing in the humanities and arts, and the online classroom itself offers many novel possibilities for peer collaboration and sharing.[25]

Throughout the Implementation Grant period, user feedback in regular pedagogical meetings and comments offered at various workshops and conference presentations stimulated HyperStudio's efforts to prototype a new working space in which students can collect and organize their annotations from different class readings as the basis for essay writing. In a series of focus groups we conducted with classroom instructors and students, specific possibilities about the design for an Idea Space emerged. These explorations enabled HyperStudio designers and programmers to develop a simple but fully functioning prototype of what we call *Idea Space.* In the Idea Space field (Exhibit 1, Appendix 6), which draws annotations from Annotation Studio, users can filter and collect their annotations from across several texts, and then organize them in a note-taking fashion to build arguments. In the outline area they can also add notes that connect and contextualize their annotations. The annotations retain links to their source texts for citations; the organized annotations/citations and any additional text elements can be exported into a word processor of choice such as MS Word, Google Docs, Scrivener, or Pages. All exported annotations retain their full set of Dublin Core based metadata such as author, title, year, edition, as well as the cited text for proper citation.

Users may elect to bring their drafted essays back into Annotation Studio for further instructor or peer review, and all embedded annotations will retain their links back to their specific source locations in the original texts. We are using the open source tool "Kanban" as the basis for the Idea Space and are currently developing new funding that will enable us to offer an experimental version integrated into Annotation Studio in time for use in the fall term of 2016. A screenshot of the Idea Space Workspace and a brief description are available in Exhibit 1, Appendix 6.

We believe that Idea Space, begun under this grant, has great potential for educational innovation and fundraising. HyperStudio is collaborating with MIT's Writing, Rhetoric, and Professional Communication (WRAP) program to pursue this initiative further and openly seeking other potential partners interested in this educational technology.

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[23] https://www.w3.org/community/openannotation/ (March 2016)
[24] https://www.imsglobal.org/activity/learning-tools-interoperability (March 2016)
[25] See, for example, Edward Barrett and James Paradis, "Teaching Writing in an On-Line Classroom," *Harvard Educational Review* 58 (1988): 154-72.

Conclusion

Annotation Studio has opened up a world of humanities education and digital humanities exploration that has excited a far larger number of students, experienced educators, and scholars than originally anticipated. The fact that it operates as an open source Web application means that it moves easily across the usual educational boundaries of institution, discipline, and (even) geography to support what has long been recognized as one of the cardinal missions of the humanities — the transmission of and expanded engagement with the textual (and media) traditions of the humanities and arts. Annotation Studio reconnects readers of electronic texts with the age-old learning and scholarly practices of writing marginalia through a powerful yet easily mastered interface and brings a range of new options for social learning to the humanities classroom. Annotation Studio is participatory and collaborative in its support of an endless variety of options for sharing annotative insights, forming reading and discussion sub-groups, and devising novel approaches to classroom interactions. Annotation Studio is, to quote Johanna Drucker, a "humanities tool in a digital environment," a tool that "extend(s) humanistic inquiry."[26]

Our experience in developing, deploying, and refining Annotation Studio, supports the conclusion that what success it has achieved as a new educational application derives from the HyperStudio team's efforts to (1) design the application in close collaboration with teachers and students, (2) use open-source tools and adhere to open standards, and (3) concentrate on improving core functionality as informed by user feedback. HyperStudio's efforts to keep the design of Annotation Studio simple and to focus on core annotation activities ensures the application's versatility in a wide range of educational settings while providing a reliable foundation for adding more advanced features.

The strong positive reception of Annotation Studio during the implementation grant period may also be explained, we conclude, by the fact that writing marginalia is an intuitive, pleasurable learning experience which, in the digital framework of a web application, opens up many novel approaches to the reading and writing processes. As an open source web application, Annotation Studio benefits from the enthusiasm of many of its classroom adopters for the peer sharing approach of an educational commons, as well as from a core student and instructor interest in increasing the participatory dynamic of the classroom engagement with its subject matter. Although development of the web application has primarily focused on classroom use, the application also offers a framework for other innovative approaches to humanities and arts education. To name just two, a new connection between annotative reading and to the writing process is exemplified in the new Idea Space extension; in addition, the Shared Media Repository concept mentioned above offers new approaches to the educational and scholarly uses of archival resources. HyperStudio is actively seeking collaborators in these research areas.

It is worth noting, also, that what success Annotation Studio has thus far achieved owes much to the institutional support offered by the National Endowment for the Humanities and the core Digital Humanities resources of the HyperStudio center itself. Annotation Studio would not have been possible without the managerial experience and coordination of HyperStudio. Situated in an academic context and made up of a combination of classroom instructors, designers, digital humanists, coders, and student research assistants, HyperStudio offers the ongoing memory and planning that sustains a project through multiple years, during which many participants come and go. HyperStudio offered

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[26] Johanna Drucker, *SpecLab. Digital Aesthetics and Projects in Speculative Computing* (Chicago: U of Chicago Press, 2009) XI.

ongoing project planning and continuity, coordination of participants, a project outreach program, a working knowledge of open source resources and core technology knowhow.

Moving ahead, the Annotation Studio development team will build on the success of Annotation Studio, working with educators across the country and the globe to integrate the application into an expanding range of humanities classrooms and to advance its potential for supporting close reading, interpretation, argumentation, and writing skills. Through the deeper integration of open standards such as Open Annotation (W3C) or LTI (Learning Tools Interoperability), Annotation Studio will gain greater interoperability with other annotation tools and existing learning management systems. The use of Annotation Studio in High Schools across the country is an incentive to explore more effective ways of supporting this new group of users through workshops, teacher training seminars, and integration into existing school district infrastructures. Open source development encourages us to continue working with the growing network of open source developers to expand Annotation Studio's functionality while maintaining its core strengths of simplicity, flexibility, and responsiveness to the user experience.

Appendix: 1

Annotation Studio Screen Shots

The following screenshots provide a general overview of the core functionality of Annotation Studio. For direct access to the public version of the web application, please go to: http://app.annotationstudio.org

1. **Annotation Studio Web Application Landing Page**

Exhibit 1:
Main application landing page with log-in functions to different sub-domains. To register for an account, the user clicks on Register in the menu bar at the top of the screen. Easy access to the registration sheet, main Annotation Studio information website, and the support site are available in the top menu bar.
Here, the sub-domain MIT Staging site is displayed.

2.   Main Annotation Page

Exhibit 2:

Main Annotation Page

On the left, chapters can be selected to navigate the text. Annotated passages are marked in yellow in the text, and a list of annotations is displayed on the right. The passage associated with a selected annotation is marked in the text (see black talk-bubble icon) and also appears with the annotation, which can contain images and links to any web- based document including video, sound files, and PDFs.

3.   Dashboard with quick access to documents, annotations, and classes/groups

Annotation Studio MIT Staging

About ▾   My Profile   Help   Logout   Manage Users

Dashboard

Documents   50 Shared   29 Mine

Bill of Rights	06/11/2015
Notes from the Underground	08/29/2014
qwerty	08/29/2014
Stefan	04/03/2014
W and Iran	01/28/2014
The Forme of Cury	01/28/2014
Acetaria: A Discourse of Sallets	01/28/2014
A Plain Cookery Book for the Working Classes	01/28/2014
Delightes for Ladies	01/28/2014
Recipes	01/27/2014

See more of my documents...

+ Create new document

Classes and Groups   2 Groups   4 Classes

public

history

french

nmc

Annotations   10 Mine   10 Groups   10 Classes

and donations to carry out its mission of increasing the nu...
Acetaria: A Discourse of Sallets (Jamie F.)

START OF THIS PROJECT GUTENBERG EBOOK ACETA...
Acetaria: A Discourse of Sallets (Jamie F.)

When my guest was a little recovered, I had great trouble t...
Frankenstein (Jamie F.)

PROMETHEUS
Frankenstein (Jamie F.)

E, tomando parte, nos afastamos de processos fechados s...
MANIFESTO DO ECOSSISTEMA BRASILEIRO DA WEBCIDADANIA (Jamie F.)

Queremos combinar o mandato dos políticos eleitos com ...
MANIFESTO DO ECOSSISTEMA BRASILEIRO DA WEBCIDADANIA (Jamie F.)

grudge b...
Prologue t...

eagerly
Scandal in...

interests
Scandal in...

Sherlock
Scandal in...

Exhibit 3:

Dashboard

The dashboard offers an overview of texts shared with the user, e.g. class texts and user-created texts (Mine); an overview of a user's class and group memberships; and a list of private, group, and class annotations on all shared and private texts. The annotations overview also contains an excerpt of the annotated text and the document title.

4.   Document Upload and Editing Panel

Exhibit 4:

Document Upload and Editing Panel

Users can upload simple MS-Word and PDF documents as well as text-only documents. In addition, HTML can be added directly into the text window which contains a range of formatting and link options. Users can add metadata to the document, assign it to one or multiple classes, and define one of four status options for documents: Draft (can be edited); Published (can be annotated); Public (text and annotations can be viewed without log-in); Archived (cannot be annotated anymore).

5.   Annotation Screen with Filtering Options

Filtering is activated by clicking on the gear button at the top of the Main Annotation Page
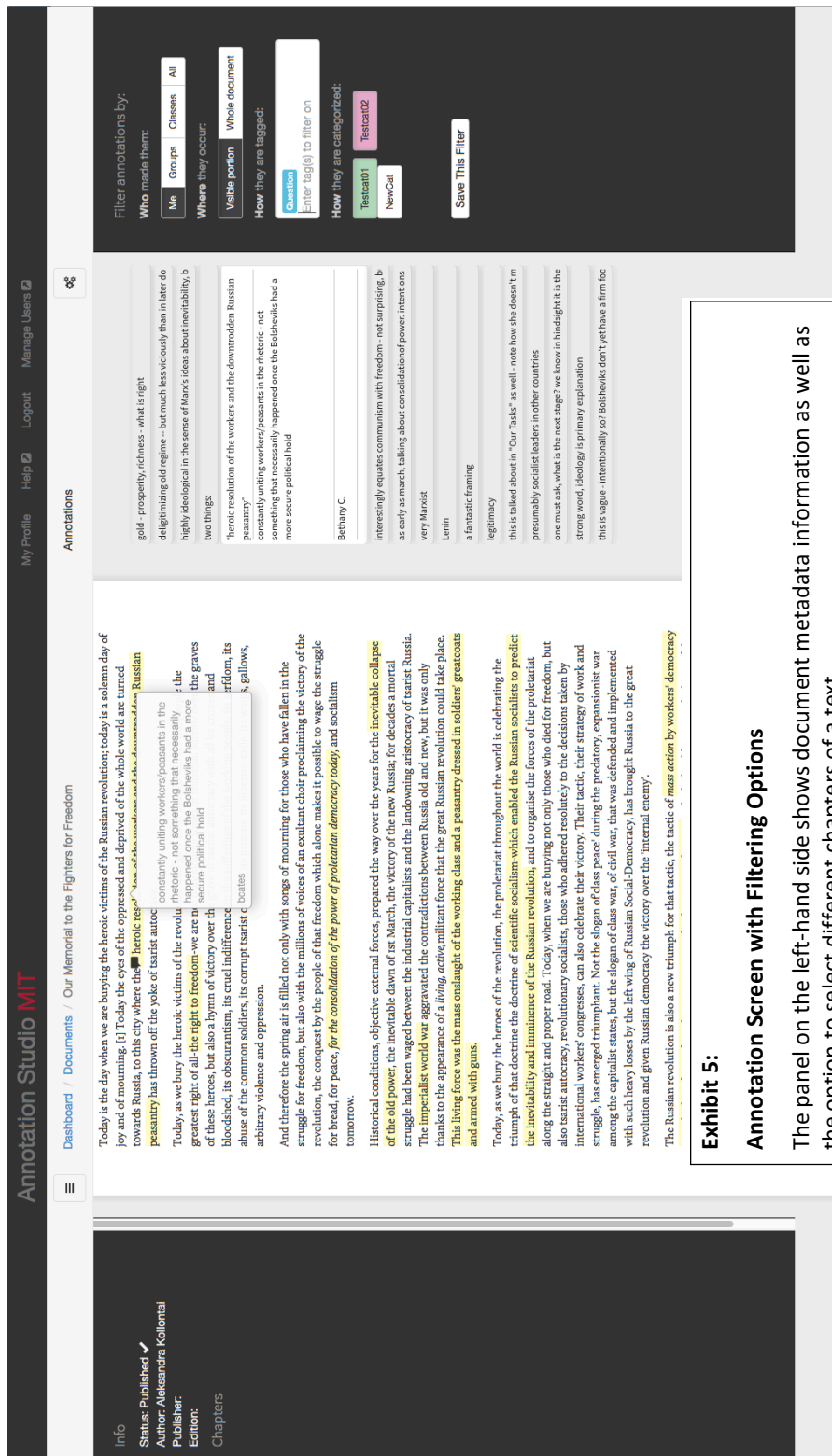
Exhibit 5:

Annotation Screen with Filtering Options

The panel on the left-hand side shows document metadata information as well as the option to select different chapters of a text.

The middle portion of the screen shows the annotated text with annotations marked in yellow and a list of annotations to the right of the text.

The annotation panel on the right-hand side of the screen offers a number of filtering options for annotations:

- Who made the annotation (Mine; Group; Class; All – only accessible to administrators)
- Where annotations appear in the text: Visible portion of the document; whole document
- How they are tagged (folksomonies)
- How they are categorized (pre-defined categories)

6. Multimedia components within texts

Annotation Studio MIT Staging   About ▾

Dashboard / Documents
Le dormeur du val

Le dormeur du val

Écoutez le poème lu ci-dessous:

▶   00:09 ▮▬▬▬▬▬▬▬▬▬▬▬ 01:06   ◀▬▬▮▮▮

C'est un trou de verdure où chante une rivière,
Accrochant follement aux herbes des haillons
D'argent ; où le soleil, de la montagne fière,
Luit : c'est un petit val qui mousse de rayons.

Un soldat jeune, bouche ouverte, tête nue,
Et la nuque baignant dans le frais cresson bleu,
Dort ; il est étendu dans l'herbe, sous la nue,
Pâle dans son lit vert où la lumière pleut.

Les pieds dans les glaïeuls, il dort. Souriant comme
Sourirait un enfant malade, il fait un somme :
Nature, berce-le chaudement : il a froid.

Les parfums ne font pas frissonner sa narine ;
Il dort dans le soleil, la main sur sa poitrine,
Tranquille. Il a deux trous rouges au côté droit.

Arthur Rimbaud
Poème annoté par Camille Le Meur

> **Exhibit 6:**
>
> **Multimedia Components**
>
> Any text can contain image, sound, and video elements. While these media documents themselves cannot yet be directly annotated, they can be fully integrated into the main annotation text, providing contextual information. Here, a sound recording of Rimbaud's "Le dormeur du val" is embedded directly in the text area above the poem.

7.   Multimedia Annotations

Exhibit 7:

Multimedia Annotations

Any annotation can contain links to images, sounds, videos, and other web-based documents. Annotations with media documents appear within the annotated text on mouse-over; they also appear within the annotation sidebar when clicking on the respective annotation.

Here, a video interview with Bruce Riedel, Director of *The Intelligence Project* at the Brookings Institute, is embedded within an annotation.

8.   User Profile Page

Accessed from the "My Profile" option in the menu bar at the top of any Annotation Studio screen.

Exhibit 8:

Profile Page

A user can easily add to or delete classes from her profile. Membership in classes determines visibility of texts in the user's dashboard; membership in groups determines visibility of annotations in the dashboard and the annotation side bar.

Appendix 2:

Assessment

In educational technology projects like Annotation Studio where an innovation is introduced in the classroom, the assessment of student outcomes should be an important component of the experimental design and development processes. The sheer daily complexity of managing a new curriculum makes capturing outcomes challenging. Assessment and feedback may be left solely as activities that happen after the completion of the course. For Annotation Studio, we sought to integrate assessment considerations and planning at the outset and to make use of new insights in ongoing design and development processes. HyperStudio's development approach focuses on principles of co-design and agile development which includes frequent meetings with collaborating instructors, regular access to students and immersion in the educational culture and its routines. Being situated in an academic department gives HyperStudio an advantage of being able to routinely gain--and sometimes immediately incorporate--insights from the classroom and results from ongoing assessment activities into the design process.

Assessment and pedagogical co-design. In the design and development of Annotation Studio, the HyperStudio staff presented collaborating MIT faculty with a model of "pedagogical co-design" and worked closely with them in designing and implementing a program of assessments that would measure selected learning outcomes and then compare the outcomes with the intended objectives. These collaborative efforts, developed in an ongoing series of semi-weekly pedagogical meetings, were complemented by special presentations on formal assessment approaches by our assessment specialist, Dr. Andreas Karatsolis. The process enabled instructors, students, and designers to participate in evaluating the effectiveness of using Annotation Studio in the classroom. Pedagogical co-design distributes design priorities and learning goals across a representation of classroom stakeholders and fits the basic digital humanities model of project development through collaboration and shared expertise.

Use of the project assessment specialist. Our methodology, based on the input from our assessment specialist, followed well-established literature in the Learning Sciences on course design.[27] To introduce the instructors who were using (or intended to use) Annotation Studio to this conceptual framework, Dr. Karatsolis offered two presentations, one at a semi-weekly Annotation Studio pedagogy meeting and another at an IAP workshop (the interclass January session at MIT) for the larger MIT community. In addition to these formal sessions, Dr. Karatsolis, conducted pre- and post-interviews with students who were using Annotation Studio, participated in all pedagogy meetings throughout 2014 and 2015, and provided feedback to instructors in one-to-one sessions. The individual meetings were devoted to collaboratively designing the assessment programs for specific courses and reviewing the results these efforts yielded.

Assessment methods vary across multiple fields. Annotation Studio may be adopted across a spectrum of humanities fields and courses, so there are challenges to devising a general educational assessment approach to annotation itself. There are a variety of studies of annotation in the framework of specific fields, courses and pedagogical strategies that may be studied for approaches to specific applications of

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[27] Dee L. Fink, *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses* (San Francisco, CA: Jossey-Bass, 2003); Grant Wiggins and Jay McTighe, *Understanding by Design*, 2nd ed. (Association for Supervision and Curriculum Development, Alexandria, VA, 2005).

annotation in the classroom.[28] The courses at MIT that we eventually analyzed came from the Humanities in general, but from different departments and fields such as Global Studies and Languages (Spanish and German), Literature and Comparative Media Studies / Writing (Creative Writing). Each course had quite different requirements and constraints, so we approached assessment in a more general way to determine student perceptions of the value of annotation in their coursework and how the use of Annotation Studio impacted the students' ability to reflect on and discuss texts in oral and written formats. We used survey instruments where students self-reported on the effectiveness of Annotation Studio for their class; focus groups conducted by Dr. Karatsolis with students on their general impressions of how annotation may or may not improve their reading and writing practices; and analyses of student products (essays and final exams) in relation to the annotations they had produced.

Annotation Studio supports an expanded variety of classroom approaches. The results of our assessments with students overall showed that they appreciated using Annotation Studio in their classes, not so much because they were not familiar with the activity of annotation (in fact more than 80% said they already used marginal annotations in other formats), but because the application supported a variety of interesting, novel interactions with instructors and other students. Annotation Studio expands the social engagement with content in the humanities and arts. In the Spanish class, students claimed that Annotation Studio was useful in identifying and sharing themes—for example, locating and discussing portions of the text that supported a certain concept. In a Short Story Writing class, 80% of the students thought that Annotation Studio was helpful or very helpful in supporting them in gaining insights for revising their work at the language/discourse level. In two sections of the same Literature class taught by different instructors, a pre/post survey showed that 70% of the students found Annotation Studio to support both their reading analysis and writing. The same students also reported that they perceived that annotation increased their understanding of complex information and the reading/writing process. Overall, the surveys were encouraging and provided useful input for helping instructors redesign curriculum and incorporate Annotation Studio more effectively into their classes.

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[28] See, for example, the survey by James Blustein, David Rowe, and Ann-Barbara Graff, "Making Sense in the Margins: A Field Study of Annotation," *Proceedings of the 15th International Conference on Theory and Practice of Digital Libraries: Research and Advanced Technology for Digital Libraries* (New York: Springer, 2011): 252-259.

Appendix 3:

Annotation Studio Use Cases

The following use cases of Annotation Studio offer a variety of approaches to annotation in a range of humanities classrooms. This is just a small sampling of the remarkable variety of uses the application has found in contemporary educational settings. Indeed, from the standpoint of use, Annotation Studio appears to inspire constant novelty and originality in approaches to humanities and arts education. Additional details on each of these mini-cases and on others can be found on the Annotation Studio Info Website: http://www.annotationstudio.org/pedagogy/case-studies/.

Mary Isbell (University of New Haven): Annotation Studio in First Year Writing

Mary Isbell, now an Assistant Professor of English and Director of First Year Writing at the University of New Haven, used Annotation Studio in a First Year Writing Seminar when she was a Postdoctoral Fellow at Yale University. She used Annotation Studio to spark a conversation about how authors use source materials in their texts.

Mary Isbell asked her students to locate every citation in "The Amateur Spirit," an essay by Bliss Perry. Students collaborated to highlight every citation, determining whether it was paraphrased or directly quoted, and identifying the author of the citation.

The highlighting feature was particularly useful, Isbell noted, because it visually demonstrated to her students "how much of the essay had come from another place and how much the author was interacting with the ideas of someone else." By working through the text, students could see how the author was using sources, and this helped students identify "a problem they could work with." Furthermore, this exercise with Annotation Studio sparked a conversation and introduced terms that would be used for the rest of the semester.

The full case study can be found at: http://www.annotationstudio.org/portfolio-view/mary-isbell-spark-a-conversation/

Roberto Rey Agudo (MIT): Annotation Studio in Spanish III

In the Spring of 2014, Roberto Rey Agudo, Lecturer in Spanish in Global Studies and Languages at MIT adapted assignments he had already created and used in his Spanish III class to Annotation Studio. "I wanted to see how I could incorporate it into what I was already doing," Rey Agudo explained. "I did not want to have to change radically what I did. I just wanted to see how Annotation Studio could help me enhance what I was doing in class." Accordingly, Rey Agudo adapted two pre-existing assignments for the digital annotation environment. For the first assignment, he had students read "Esquina Peligrosa" in Annotation Studio, tasking them with finding instances that would corroborate one of three pre-determined interpretations of the story. Students had to find passages in the text that they thought were indicative or justified their interpretations, write a comment, use a tag to identify it, and read what other students had written as well.

For the second assignment, using the reading "El Episodio del Enemigo," students had to look for specific information in the text, identify synonyms to expand their vocabulary, and predict the ending. In class, they shared their predictions and checked them against a video version of the story. Afterwards, they worked with the text in Annotation Studio, doing live annotations in groups to find evidence in the story that were hints to the ending.

"The assignments that I had them do on Annotation Studio always involved students reading other students' comments and discussing what they've found out about other students so we were able to bring their readings and comments into the class discussions," Rey Agudo explained.

The full case study can be found at: http://www.annotationstudio.org/portfolio-view/roberto-rey-agudo-enhancing-teaching/

Jody Gordon, Chris Gleason (Wentworth Institute of Technology): Annotation Studio and Public Humanities

The goal of Jody Gordon's and Chris Gleason's studio course "Digital Approaches to Boston Culture: Curating the Legacy of James M. Curley" in the Media, Communications, and Culture Program at Wentworth Institute of Technology, was to engage their mostly non-humanities students in humanities issues from interdisciplinary angles using digital techniques. Annotation Studio and a variety of other digital tools such as Omeka, Neatline, and Worldmap were employed to curate an exhibit for each of the rooms of former Boston Mayor James Curley's currently empty mansion.

In Annotation Studio, Gordon and Gleason used a 35-page manuscript that gives a complete, room by room, overview of the contents of the James Curley House. It is an invaluable document, as today none of these items remains in the house. Working in groups, students in this class identified and defined architectural terms, added metadata to objects mentioned in the text, and added historical images to illustrate the missing items. Ultimately, Gordon described, "the ability to populate this manuscript with metadata and other materials gave us the ability to repopulate these rooms with the objects that actually existed."

The full case study can be found at: http://www.annotationstudio.org/portfolio-view/teaching-digital-humanities-to-stem-majors/

Elizabeth Wood (MIT): Annotation Studio and the Russian Revolution

In her class Soviet & Post-Soviet Politics and Society, MIT history professor Elizabeth Wood used Annotation Studio to expose her students to the same techniques that established history scholars use of sources as part of their regular research. "For me, language is evidence and language is what has to be carefully investigated because how somebody addresses something is a window into their mindset. So as a teacher, what attracted me to Animation Studio was the sense that it's a way to teach students what I do intuitively: when I see a text I'm immediately drawn to the words, the language, the phrasing, the stereotypes, the unconscious choice of words, above all the way of constructing the world."

For their deep textual analysis, students in this class could select from a number of uploaded original documents, translated from Russian. Students annotated documents individually as part of their

homework assignment and shared their comments with the whole class. In several class sessions, projected documents along with student annotations were discussed collectively. Annotation Studio allowed students to look beyond the content, or as Wood put it: "… many students think what they are supposed to get is the content, the meat and potatoes of the material. They don't understand the value of not looking at what was said but how it was said not just what was decided, but how people were thinking about what they were thinking." It gave them a way to think about "overtones, the way you would have in music, that words have not only denotations but also connotations."

For Wood, using Annotation Studio in this Russian History class gave students "a concrete example for their own thinking. It generated a richer discussion because we could take concrete words and phrases and say 'oh, the early revolutionaries talked about creating a constituent assembly. How did they talk about that constituent assembly? What did it mean for them? What were their dreams? What were their ideals? We can look at the actual text.'"

Appendix 4

Instructors' Evaluations of Annotation Studio's Impact in Literature and English Reading Classes

The following two accounts of instructors using Annotation Studio in their classes demonstrate the applications adaptability to different institutional contexts and educational levels.

1. Wyn Kelley (MIT): Annotation by Design

What can students learn from using Annotation Studio?

In two years of experimenting with Annotation Studio in literature classes, I have observed developments in students' learning that suggest the power of digital tools to focus their reading, writing, and critical thinking. Beyond progress in skills that students typically refine in humanities classes and for which our Annotation Studio tools and pedagogy seem ideally suited, I have also seen remarkable growth in students' heightened awareness of themselves, not just as novice learners but as active researchers in my field. They do not simply learn to do something in these classes; they become something.

This is new.

Classic Habits, New Expectations

Both my students and I bring certain traditional tools to any literature classroom. We start with books and the hope that reading will produce pleasure, stimulation, and insight. We also bring certain ideas of literacy that arise from mid-twentieth-century models of close reading. For many of us, the reading experience comes with a set of standard expectations:

- It is linear. You start at the beginning and go to the end. Books have a design that you can best appreciate by reading in a given order.
- It is continuous. Books have a unity and cumulative effect that you would lose by jumping around.
- It is complete. You must read it all to get the meaning.
- It is deep. Your first reading gives you "only" surface understanding. You must read and re-read, looking for significant patterns of language and theme, before you can say you understand the text.[29]

Students often come to class with some training in these reading patterns, a sense of the mysteries of texts, and an experience, sometimes, of having probed these mysteries to achieve understanding of the text, its characters, or its themes. If they have not had some experience of a text being "relatable," they tend not to choose a literature class.

With these classic literacies, students also bring training that arises from their experience of reading, writing, and thinking in a digital space. Henry Jenkins has called literacies derived from online reading communities—fan sites, book clubs, writing groups—a "participatory culture" that teaches students different skills from what they might learn in a traditional humanities classroom. Humanities instructors have responded to students' digital cultures of reading in various ways: by incorporating visual media into the curriculum; by making learning more social, giving students freedom to create digital projects on their own or in teams; or by using the power of internet tools to visualize, search, mine for data, compare, and map texts in more diverse and compelling ways. This mixture of old and new media, traditional and technologically advanced learning styles, private and social modes of reading has vastly increased the range and potential of what we can do in our classes. Starting from the first discussion of whether we use print or digital texts, whether laptops belong in a literature class or not, whether Wikipedia research is useful, whether blogs can provide models of good writing, we can debate endlessly the impact of new media literacies on traditional modes of reading and writing.

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[29] Henry Jenkins and Wyn Kelley, eds. *Reading in a Participatory Culture: Remixing* Moby-Dick *in the English Classroom* (New York: Teachers College Press and National Writing Project, 2013) 94.

Poised on a Line

Regardless of how students view humanities learning in digital spaces, they tend to hold certain truths to be self-evident. Chief among these is the fact that students do one thing, professors another. Professors know more than students do, and they teach what they know. Students do not expect to know what professors know, but they assume they can develop certain skills and competencies that will aid their personal and professional growth. In a literature class, these skills include reading and writing, research, and critical thinking. Generally, students do not, however, anticipate learning what humanities professors *do*: that is, to edit documents, advance scholarship, or have field-changing or world-altering ideas.

Yet students have access to advanced tools in my field, tools that were not available to undergraduates until very recently. More and more they can do the work literary scholars did in the past: examine rare books and manuscripts, study sources, translations, and adaptations, research among academic books and journals, publish to a wide audience. Technically they can do many of the things academic professionals do, even if they lack the confidence of experts.

Often my students can also write code, solve problems, research complicated data, and play a sport or a musical instrument too. But ask them to write something, and they may fall apart. I think the problem may be one of nomenclature, even identity. Students in a literature class too often think of themselves as novice "readers" and "writers"; because they are novices, they must be bad readers and bad writers. But when I give them tasks that require the use of Annotation Studio, and when I tell them that as they complete these tasks they are working as editors, scholars, and critics, something remarkable happens.

They become better readers and writers.

Students as Editors

When I started to collaborate with HyperStudio first on *Miximize* in 2011 and then on Annotation Studio, I was thinking about writing and publishing in a digital space. Students, it seemed to me, can now publish without traditional editors. They do not have to use editors at all, but if they want to be taken seriously, they need to know and use the standard tools of editing: preparing a manuscript to be read by others, improving language, structure, and argument so that their work earns respect. Yet students seldom think of their essays as something to *edit*. Once they have written, perhaps even revised them, they put them aside. What different kinds of skills would they need to make their writing public in a meaningful way? Annotation Studio offers a simple, practical tool for editing their own work—making comments and changes, speculating on how different audiences might read the text, going a step further from tasks they had already practiced in revisions.

Editing is, however, very different from writing, and I found that using Annotation Studio to edit made students aware of details in their papers that they might have missed. It also reinforced the social aspects of editing. Whether they edited their own essays or those of other students, whether they edited privately or in groups, they had to think about audience in new ways, as extending beyond a single reader, the professor, to peers inside and outside the classroom. Editing also gave students a sense of responsibility for their own work. They were not simply handing it to an instructor for a grade but were making themselves accountable for their ideas and expression. Annotation made their editing public and visible, to themselves and to potential collaborators, and even if we did not end up publishing these papers outside the classroom, students were learning the skills needed to reach a wider audience.

Similarly, students might edit the texts they read and studied. At the time I was teaching Mary Shelley's *Frankenstein* as a compilation of literary body parts, of stories and ideas that Shelley borrowed from literary sources. Finding and tracking these sources and then recording their findings with Annotation Studio, students could see the layers of Shelley's artful borrowings and adaptations of the myth of Prometheus, for example, or the Bible, Milton's *Paradise Lost*, the Romantic poets, Humphrey Davy's lectures, and other materials. As they glossed unfamiliar words and researched unknown texts, they were creating a new text, a version of *Frankenstein* for their community, their peers. As they edited the text, it or parts of it became theirs; it became meaningful to them.

Whether editing texts they'd read or ones they'd written, students found annotation the first step of a rewarding and absorbing process. In Annotation Studio, they could create a personal archive of documents; they could use Annotation Studio's selection features to engage directly with the text; the record of their markings and comments could create a reading map, a visualization of their own reading process; and their comments might

form the basis of a developing hypothesis or argument about what they had observed. Even before sharing their annotations with classmates or an instructor, they had a searchable, sharable body of work on which to build for essays, reports, and discussions. And whereas they found writing intimidating, editing seemed manageable, especially within the clear parameters Annotation Studio provides. As their annotations developed into new writing, students found their inhibitions about writing disappear.

Students as Scholars

Students could become editors. It did not seem so big a step for them also to become researchers in a humanities field, using the same scholarly tools that academics have acquired. What do scholars do, after all? They learn the typical research tools and discourses of a field; they create communities around a subject or set of methods; they generate new ways of thinking or looking at materials; they take risks, tolerate ambiguity, and invite failure; and frequently they collaborate, thereby nurturing individual growth and the development of a field as well. Using Annotation Studio, I found that students could accomplish many of these tasks within an undergraduate classroom. They could become scholars.

My case study was an advanced undergraduate seminar on Herman Melville, called "Mapping Melville" and taking as its basic premise the idea that digital tools now comprise an important part of academic scholarship in the humanities and should be part of students' work with a major author. We approached the idea of "mapping" through three different collaborative projects.

The first involved geographical mapping and drew on students' examination of Melville's use of place names in *Moby-Dick.* Although the students depended on a mapping tool called Locast (developed in the Mobile Experience Lab at MIT), they annotated *Moby-Dick* extensively as a way to explore Melville's geographical imagination. From this exercise they discovered that Melville refers to many more places than his characters visit, even on as extensive a journey as that of the whaling ship the *Pequod*. An extraordinary number of these geographical references cluster in regions, some predictable (Nantucket, the South Seas), some not so predictable (Europe, Africa). These discoveries led to innovative reports and essays exploring the cultural, historical, and literary significance of places they might never have noticed otherwise. And in each case, students chose locations of some personal interest—a place they had visited, for example, or that a family member came from. Their work vibrated with the intensity of their discoveries.

A second assignment involved source study of the kind I had used in my class on *Frankenstein*. For this project, students chose a literary source for one of Melville's short stories—say, his use of the Biblical story of Jael and Sisera in "The Bell-Tower" or Spenser in "The Encantadas" or Edgar Allan Poe in "Bartleby, the Scrivener." Researching literary scholarship on library shelves and in databases, students quickly established that Melville had borrowed from other authors. The challenge was to show what difference these sources made, and here the use of Annotation Studio proved invaluable, as students added blocks of source text to their annotations and developed comparisons between Melville and other authors. Again, the resulting essays showed fine-grained analysis of details as well as analyzing larger patterns of plot, genre, or theme. Topics included the presence of melodrama in Frederick Douglass's *The Heroic Slave* and Melville's "Benito Cereno"; Dante in "The Bell-Tower"; and Milton's *Paradise Lost* in Melville's difficult novel, *The Confidence-Man.* I have never seen research projects of this depth and range before in an undergraduate seminar.

Lastly students used another digital tool, TextLab, developed at Hofstra University by John Bryant and Nick Laiacona for the Melville Electronic Library (MEL), to study Melville's manuscript revisions of *Billy Budd*, which the author never finished or saw printed. The text is notoriously unstable, but reading a college edition might lead one to assume that Melville's intentions for it were coherent and legible. They are not, and again Annotation Studio served an important role in breaking down the text for students into manageable sections for them to read and annotate closely. In tracing the words Melville added to or deleted from his manuscript and comparing them with an edited version in Annotation Studio, students came to fresh conclusions. Remarkably enough, they could engage with and understand complicated text-analysis theory developed by Merton M. Sealts, Jr. and Harrison Hayford in the 1960s, theory that is of great interest to scholars but seldom makes its way into students' hands and minds.

My students, however, emerged from this class conversant with forms of research, analysis, and inquiry that until quite recently lived in the specialized domain of Melville studies. I was fascinated to see how Annotation Studio enabled them to become scholars of American literature. For them, the class had made arcane research

practices transparent and accessible, inviting their participation in the critical and creative experiments academics pursue. For humanities scholarship considered more broadly, this kind of learning can revitalize traditional fields while reaching across them, managing information in new ways, creating collaborations between students and more advanced scholars, and breaking up rigid methods and analytical structures. In other words, the class was as good for this literature scholar as it was for the students.

Students as Critics—or Maybe Designers Themselves

I have found that when Annotation Studio takes a central place in an undergraduate classroom, students at a certain point "go meta." Experienced in using and creating digital tools themselves, they tend to hack Annotation Studio, to introduce improvements, new uses, and fixes of their own. For example, long used to framing their use of Annotation Studio as a group in-class exercise—a close reading of a passage, for example—I was surprised to see students annotating their texts as we were discussing them, capturing good ideas from the discussion as it flew by. Using an annotation tool for taking in-class notes? It had not happened before, but once it did, students added many in-class annotations to the ones they did for their assignments or team project work.

They also contributed enthusiastically and innovatively to our assessment research. In the spring of 2015 I taught a Reading Fiction class with another Literature professor, Ina Lipkowitz, in which we shared the same reading list and assignments but varied our use of Annotation Studio. She had students work together in groups to generate and share comments; my students did not see what the other students wrote in Annotation Studio until much later in the term. A HyperStudio researcher, Rachel Schnepper, visited both classes, observed discussions, and read essays and assignments to evaluate the difference public vs. private uses of the tool might make. Regardless of her findings, my students became engaged themselves in the assessment of Annotation Studio, volunteering many suggestions for improving and expanding the tool. They could now think of their classroom work as a form of research and development of the tool and its pedagogy. Their labors might serve a larger purpose than the grade they earned on papers and other assignments. In this evolution, students became critics of the whole enterprise of the class, of literary study in general and of annotation in particular.

In one striking example of the way students using Annotation Studio became more aware of their own learning styles and outcomes, becoming more "meta" in their studies, one in the Melville seminar said at the end of the semester that she had begun to think of literary study "in the context of engineering and 'design thinking'" such as what she encountered in her engineering classes. Her comment opened my eyes to the ways students expect to become designers of experiments in their science and engineering classes—why not in Literature too? Annotation Studio gave my students opportunities to work as Editors, Scholars, and Critics. But for some it also seemed compatible with skills humanities professors seldom invite their students to use—to design not just their own tools but their own learning process, their own experience of reading and writing and thinking critically. In that moment, I saw unexpected possibilities in the pedagogy we had developed, discussed, and assessed over the past few years of the NEH grant.

Conclusion

This report reflects on and distills a wide range of classroom activities, focusing primarily on a recent two-year span. I have seen startling developments in my students' work as they have experimented with many different uses of Annotation Studio.

I have also been involved with development of Annotation Studio for use in advanced scholarship and editing, through the HyperStudio's partnership with the Melville Electronic Library (of which I am Associate Director) and its suite of scholarly editing tools (TextLab, Juxta Editions, Itinerary). Unquestionably Annotation Studio has potential for as rich contributions to humanities scholarship, research, and editing, as to pedagogy, as my experience has demonstrated so far.

Annotation Studio also has immense value outside of the academy. As I have seen with both scholarship and teaching, Annotation Studio is remarkably transparent. It makes reading, writing, and thinking visible, enabling creative and critical connections and discoveries. In that sense, it has unlimited possibilities for all kinds of communications outside the classroom or lab.

We are just beginning to understand that potential, and I hope to continue the experiment in new directions in the future.

2. Jessica Kubiak (Jamestown Community College): Introducing Annotation to the Developing College Reader: Using Annotation Studio in ENG 0410, Developing Reading Versatility

Background

This semester, I'm teaching three sections of ENG 0410, which is the second of two reading courses a student might take upon enrolling at Jamestown Community College, part of the State University of New York system. Because we're an open access institution, students who have not completed advanced high school work are given placement tests that help us determine which English and math courses they should take. Our student body profile is similar to that of open access institutions across the nation, with about fifty percent of students requiring developmental coursework. Our campuses tend to enroll rural, white, first-time college students, and most of my developmental reading and writing students travel from homes over an hour from campus, with limited internet access and few other educational opportunities or amenities nearby. Approximately half of my students are "traditional," while the other half is made up of people perhaps more emblematic of the community college learner: older, most likely with children or grandchildren, either recently laid off or working multiple part-time jobs, and generally distrustful of institutions. Rarely do I encounter a developmental college student with previous exposure to academic expectations or habits; my job is to prepare learners to utilize and respond to texts for academic purposes.

One of the most insurmountable obstacles that my students face is their belief that good readers always read effortlessly, without stopping to reread or consult other sources of information. I have a few tools at my disposal to counter this, and most center around modeling the behaviors of good readers: active reading skills such as slowing down and connecting unfamiliar concepts to existing schema, identifying rhetorical patterns and main ideas, and making inferences. These skills get manifested through the process of annotating, which is the backbone of my reading instruction. And while demonstrating my own reading-related habits of mind is useful for helping students understand that reading *is* a process, it's only when they see their peers engaging in this process that it begins to seem accessible, and begins to have value and meaning for them. This, I think, is where my students benefitted the most from their use of Annotation Studio.

Assignment Learning Outcomes

My goals for the two Annotation Studio assignments that I developed were for learners to:

1. Gain awareness of the recursive process of reading, as well as the connection between reading, thinking, and writing.
2. Respond authoritatively in writing to a published text.
3. Engage with the ideas of peers in a non-threatening, non-distracting digital environment.
4. Communicate within the parameters of a shared digital space.
5. Establish a transferable reading routine that includes not only annotation, but the consideration of other readers' ideas.

Assignment #1 Sequence

I first imagined I'd use Annotation Studio an as adjunct to annotation instruction. Students would be introduced to the kinds of text that get annotated, along with methods of annotating and ways to respond, and only then would I introduce AS. However, the beauty of digital annotation is that students can witness each other's ideas in development, and can consider a variety of approaches to responding to a text. So I introduced AS to my 0410 students early in the semester.

Prior to the first AS assignment, I foregrounded an introduction to the concept of annotation in general by asking students to reflect on a series of questions:

- What do you want to get out of a reading?
- What difficulties do you face when reading, especially as they relate to your reading goals?

Written responses and class discussions led to my introduction of annotation as one way to better ensure reading success. I assigned a reading from our textbook, asking them to annotate in small groups.

Students then compared their annotations with other small groups, and reported out to the whole class about the content that was annotated, as well as the methods used for annotating and potential uses for marked up sentences and marginalia.

Based on their experience of annotating, students developed a "Class List for Annotation" of the kinds of information that should be annotated.

Next, students reflected on the benefits and limitations of their first experience of annotating; I asked them to think specifically about the experience of reading with a group, and the experience of writing in a textbook, both of which tend to be unfamiliar territory for learners.

Students expressed some expanded understanding of both annotating and reading as a result of group work, along with some dismay at the material limitations of handwritten annotation.

At this point, I asked the group to select an article from *Yes!* magazine, and told them that they would be once again reading and annotating with others, only this time it would be with their entire class, and it would happen online.

I demonstrated the use of Annotation Studio and instructed students to create accounts, which many of them did on the spot using their cell phones. I then split the class into several groups, assigning everyone in each group responsibility for annotating for one element from our Class List.

Upon completing this task, students were asked to read all of their peers' annotations, and to select three notes that increased understanding or appreciation of the reading, noting how each annotation was helpful in that regard.

By the fifth week of the semester, students were expected to speak without prompting about issues raised by the text they'd read and their classmates' responses, and to make precise textual references.

Results and Analysis

Participation in this assignment was nearly one hundred percent. Because this series of activities was completed at the beginning of the semester, every student enrolled in the course was exposed to online digital annotation.

- The typical attrition rate in developmental courses is about fifty percent, and the single assignment completion rate in my reading courses is usually about thirty percent, so ensuring nearly all of my students had access to these tools and ways of thinking was significant.

Student annotations were plentiful. Most students highlighted and commented to an extreme, resulting in documents almost entirely yellowed with highlighting. Annotations included reworded ideas and quoted phrases; questions about author's purpose, thesis, and credibility; emotional responses; hyperlinks to further readings; definitions of unclear terms; labeled textual components; illustrations of the authors and major concepts; and challenges to the text.

- Individual contributions to the marked up document far exceed anything I've seen on students' print texts, even on disposable handouts that are the focus on intense in- and out-of-class work. It might be that student comfort with digital profuseness gives them access to digital annotation that isn't available with print texts. Furthermore, since several students highlighted the same phrases or passages, and, at some points, wrote essentially the same comments, I'm not as concerned as I once was that learners might not produce original responses.

Written reflections on and classroom discussions about annotated documents indicated that students were most interested in peer annotations that defined unclear terms or challenged the text. Upon hearing that their annotations resonated with one or more peers, learners immediately began contributing even more to classroom discussion and communicating more assertively.

- This suggests that the act of digital annotation makes explicit the necessarily concurrent processes of reading and writing, and does so in a way that students are writing directly in response to an established text, and are therefore, in essence, borrowing the authority of the published author. This also suggests what I have long suspected about developing readers, which is that, although college reading (and college composition) textbooks typically wait to address argument, this is the rhetorical mode that students most readily seek out.

Other Outcomes

In addition to the learning outcomes I established when developing this assignment, the following were also realized. Digital annotation with AS:

1. Mitigated practical barriers to annotating print text that are typically encountered by my student population (due to rented textbooks, textbook depreciation for resale purposes, and a well-engrained belief that books are not to be written in).
2. Introduced digital media to those unfamiliar with computing technologies; and gave those comfortable with computing technologies a familiar platform for academic work (as many of my students who strongly associate digital media with their everyday lives often have adversarial relationships with print-based culture).
3. Introduced textual annotation as a common denominator across academic disciplines.
4. Established familiarity with a format (digital media, highlighted text, margin comments) that is consistent with what learners will encounter in college composition instructor feedback.

Student Response

In my courses, students encounter multiple access points with digital media: online course management systems that house assignment sheets and discussion forums, retrieval of articles from online databases, and assignments requiring website development (using site templates and requiring no coding knowledge). And although I have never explicitly asked for feedback about these, about twenty percent of my students – without prompting – express dismay, frustration, or resistance regarding my use of digital technologies in reading instruction and assessment.

After students completed their first online annotation assignment, I did take class time to ask for their feedback. My questions were open-ended: What did you like about it? What didn't you like about it? What suggestions do you have for improvement?

The following sample of student responses are representative of how positive and forward-looking they were:

- "It's easy to get into and use."
- "It makes our notes look organized."
- "We have unlimited space to write, which is good."
- "I like that some notes can be kept private."
- "It's easy to access other resources on the internet while you're annotating."
- "I like that it automatically highlights."
- "I liked it!"
- "I think we should use it again."
- "I wish we had this in all our other classes."
- "I wish it could be more like other social media, with a way to talk with each other."
- "Getting used to it was a challenge, but I did it."
- "I don't understand the difference between a Class and a Group."
- "They should put an internet search engine into the program so you don't have to click away from it."

Assignment #2 Sequence

Upon completing the first assignment involving Annotation Studio, learners hadn't yet moved beyond annotating for unclear terms, emotional reactions, and connections to prior knowledge. We've since fully explored argument development, critical reading, purpose, tone, rhetorical patterns, and other components of academic reading. So, to give students the opportunity to revisit the process of collaborative digital annotation with these newly developed skills at their disposal, an extra credit option for the final extended out-of-class assignment of the semester is for learners to mark up the introduction to Michael Pollan's *The Botany of Desire*. The assignment itself requires students to explain how Pollan develops his argument through each of the book's four chapters. *Botany* is an incredibly challenging text for developing readers, but I build plenty of supports into their reading, including this extra credit option.

Extra Credit: Annotate the introduction to *The Botany of Desire* by:

- Identifying and explaining ideas that get further developed or illustrated in one or more chapters, noting in your annotations where and how this happens.
- Identifying images or concepts that get referred to throughout the book, explaining how these images or concepts remain constant or take on new meaning.

This is essentially a large portion of the extended assignment, only done in reverse. Students who are motivated by grades will take the time to attempt the extra credit, thereby ensuring both increased comprehension and success on the extended assignment. And for the uncertain student, the annotated introduction will provide another perspective that could contribute to successful completion of the extended assignment. The most important benefit, though, is that annotation will continue to be viewed as a tool for both active reading and sharing the experience of working with a text.

Appendix 5

Distribution of Annotation Studio Use During the Implementation Grant Period (September 1, 2013 – December 31, 2015)

The use of Annotation Studio expanded rapidly during the NEH implementation grant period, and we represent some simple patterns here. We did not have the means for exploring this growth in more detail. Generally, we found that the application moved freely across (1) disciplines or fields of study, (2) institutions, especially secondary and college educational levels, and (3) national borders.

Figure 1:
Growth of registered users on the public Web app (http://app.annotationstudio.org) from 9/1/2013 to 3/1/2016. These figures do not include users on the currently 23 institution-specific subdomains.
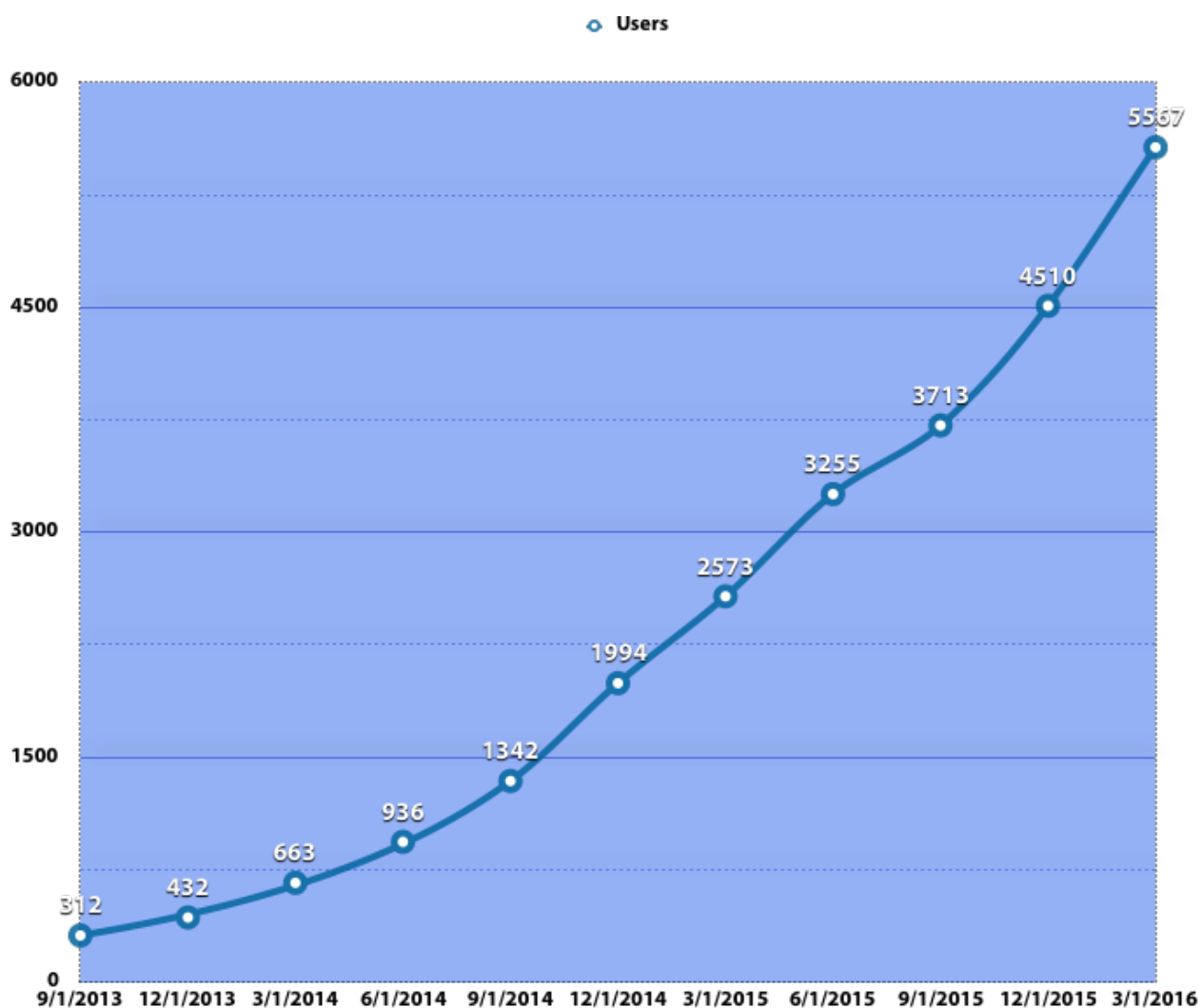

Overall, during the implementation grant period, more than 600 distinct educational subject classes have used Annotation Studio for one or multiple units as part of their curricula, often in multiple semesters. Although we have contacted a great number of educators during the grant period and

discussed their uses and views of the project and its contributions, we have had some difficulty in determining exact numbers for various kinds of classroom use. This is largely because of the unanticipated problem that educators freely name their classes in a variety of ways: While it's easy to identify ENG100W16 (e.g. at Andover High School) as an English class, many other class names use identifiers that are more difficult or impossible to decipher. Since we introduced the option of setting up organization-specific subdomains of the project in 2014, 23 educational institutions including Harvard University, Georgia Tech, and Humboldt University in Berlin have asked the HyperStudio project team to create a separate Annotation Studio domain which offers an educational "walled garden" specific to the institution's educators and students.

Figure 2:
Distribution of disciplines of Annotation Studio class groups. These figures are only an approximation. Due to the free-form naming of class groups, many groups could not be assigned to their respective disciplines.
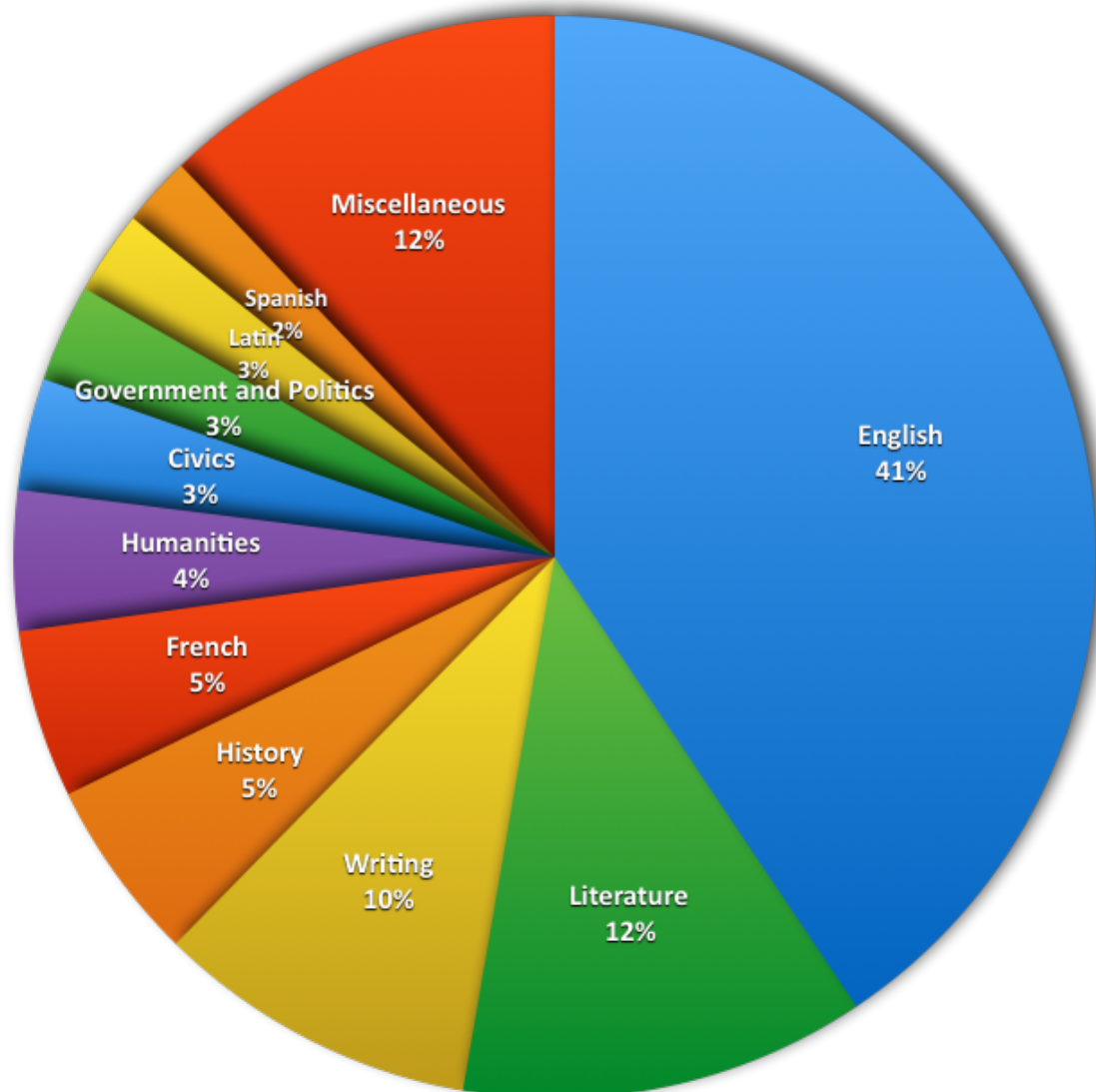
Table 1:
Institutional Use Distribution of Annotation Studio

Colleges, Community Colleges, and Universities: 595   (64%)
High Schools: 216   (23%)
Other academic institutions and not-for-profits: 50   (5%)
Corporations (including publishers and media organizations): 41   (4%)

Institutions with subdomains and /or their own Installations: 23   (2%)

Table 2:
Global Geographic Distribution of Active Class groups using Annotation Studio:

Argentina	Israel
Australia	Italy
Austria	Japan
Belgium	Mexico
Brazil	Netherlands
Canada	Peru
Colombia	Poland
Costa Rica	Portugal
Denmark	Republic of Korea
Ecuador	Singapore
Estonia	Spain
France	Sweden
Germany	Switzerland
Hong Kong	Turkey
Hungary	United Kingdom
India	United States
Ireland	

Appendix 6:

Idea Space

Idea Space, currently in working prototype stage, is projected to be an extension of Annotation Studio, in which each student's annotations are displayed and organized around the student's tags. In this space, shown below, the student's annotations (including images and other media) can be sorted, arranged and structured to provide the basis for arguments, which in turn will form the core structure for student essays or other forms of academic writing.

A work space for writing. Idea Space will help students organize citations, comments, and preliminary text to create an outline of an essay which, when drafted, can be brought back into Annotation Studio to appear in the student's dashboard (see Exhibit 3, Appendix 1, above). The student's peers or writing instructors may then provide feedback on this text by adding new comments and annotations. The Idea Space will provide both a work space for the development of writing, and also a window into the writing process itself, from which an instructor will be able to engage with the student.

Mixing and managing reading notes. In a future version the Idea Space workspace shown in Exhibit 1 below will be accessible from the top menu of Annotation Studio.

Exhibit 1:

Idea Space - Workspace

The larger workspace on the left displays a user's annotations organized by tags. Users can currently filter their annotations by tags and source document. Individual annotations can be dragged into the outline space on the right for organization, grouping, and nesting. Free form contextual notes can be added as well.

From annotative reading to composition. The Idea Space presents a novel interface that resonates with the way in which many students currently use Annotation Studio: first highlighting evidence in the text through the collaborative annotation process, and then later extracting and drawing on these same pieces of evidence to compose written arguments. Just as digital interfaces help realize an ideal

environment for annotation, they also offer myriad ways in which to support and enrich this process of cutting. The ease of sorting, filtering, duplicating and rearranging material in digital settings affords a fast and intuitive way to turn from annotative reading to composition.

Tracking sources. The capacity of these virtual materials to retain links to one another, keeping track of where and when annotations or edits have been made, may not only relieve reader-authors of some of the work of managing citations, but also give scholars a greatly augmented record of their own research process. This record may persist throughout the scholarly cycle when works exported from the Idea Space are themselves uploaded into Annotation Studio.

Modularity and adaptability. While the Idea Space is conceived as adding to Annotation Studio's support for student work, its modular design and implementation enable it to work in combination with other tools and sources of data. The application's first data module retrieves annotations from the Annotation Studio database, whose format conforms to open annotation standards, meaning that the interface could easily extend other annotation environments. A simple design for adding new data modules gives instructors the ability to tailor the application for use with their own combinations of tools and archives. Far more than a visual organizer for annotations, the Idea Space is a tool through which users can combine, juxtapose and adapt any scholarly material in the composition of compelling and richly contextualized writing.
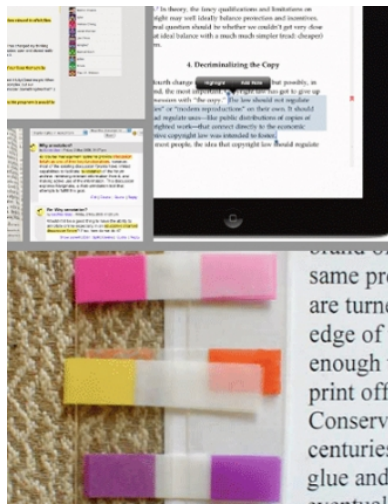
Appendix 7:

Annotation Studio in the News
(http://news.mit.edu/2014/new-qannotation-studioq-tools-translate-an-ancient-literary-practice-into-the-digital-age)

21.4.2016   New Annotation Studio tools translate an ancient literary practice into the digital age | MIT News

MIT News
ON CAMPUS AND AROUND THE WORLD

Detail, Annotation Studio program

image courtesy of shass

New Annotation Studio tools translate an ancient literary practice into the digital age

School of Humanities, Arts and Social Sciences
January 15, 2014

RELATED

Among the humanities initiatives at MIT are numerous projects in the digital humanities — a field of research, teaching, and creation that couples the disciplines of the humanities with computational approaches. Digital humanities projects often use such methodologies and techniques as web-based media, digital archiving, data mining, geo-spatial analysis, crowdsourcing, data visualization, and simulation. At MIT, digital humanities practioners use digital tools and big data to investigate research questions, while also presenting scholarship through, and within, new media forms. We recently talked with the creators of Annotation Studio, an innovative School of Humanities, Arts, and Social Sciences (SHASS) program that is empowering readers and writers — both in and beyond the classroom.

| 21st Century Humanities at MIT |
| About Annotation Studio |
| Digital learning in the humanities at MIT |
| HyperStudio |
| Comparative Media Studies / Writing |

Time was, avid readers wrote notes in the margins of much-thumbed books, adding their own thoughts to the author's and enriching the volume for future generations. John Adams, for example, is so well known for the witty repartee he exchanged with his own library that whole essays have been written about his annotations and comments.

The popularity of e-books could sound the death knell of such illuminating marginalia, but the Annotation Studio, a suite of easy-to-use digital tools developed by HyperStudio (the MIT SHASS lab for digital humanities), promises to improve upon traditional techniques for entering marginalia and side notes in books — enabling readers not only to annotate texts across media, but also to share comments with others and to enhance them with links, images, video, and audio.

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http://news.mit.edu/2014/new-qannotation-studioq-tools-translate-an-ancient-literary-practice-into-the-digital-age   1/3

Drawing on HyperStudio's educational design expertise, Annotation Studio integrates a powerful set of textual interpretation tools behind an interface that makes using the tools intuitive for both students and their teachers.

The power of annotation

Recently, HyperStudio (a research program of Comparative Media Studies/Writing) received a Digital Humanities Grant from the National Endowment for the Humanities (NEH) to continue developing and implementing Annotation Studio.

"Annotation is a very ancient practice; it's probably been around as long as reading," says James Paradis, the Robert M. Metcalfe Professor of Writing and one of the two project directors. "As text becomes digitized, it becomes more difficult to write comments. We think there's value to letting people annotate in the same space."

Annotation Studio grew out of an earlier program called Miximize, which was developed at MIT between 2010 and 2011, in close collaboration with Wyn Kelley, a senior lecturer in literature. Kelley had her class use Miximize to insert notes, definitions, and references into a digital version of Mary Shelley's *Frankenstein*.

Annotating works digitally has many advantages over old-fashioned note-taking, Kelley says. "It gives students so much more control over their work and so much more connection to the text. And, it relieves them of their inhibitions about writing. I see much better writing when our students use digital annotation."

Of the new annotation tool, one of Kelley's students said, "I am actually writing down ideas while reading, and by writing them down I'm looking deeper into the text — not like when I just read the book and said, 'Oh, it may mean this.' Now it's more, 'Oh what does this mean?' Then I keep asking questions, because I am annotating. I am thinking about the text more."

Using an open software system

Recognizing the potential of this digital humanities project, researchers in HyperStudio decided to expand the program's capabilities, and Annotation Studio was born.

"Every commercial textbook publisher is trying to create this, but they deliver proprietary stuff — not something you can adapt and change," Paradis says. "We use open software."

To date, Annotation Studio has been used in writing, foreign languages, and literature classes at MIT. The feedback from students has been positive, according to Kurt Fendt, executive director of HyperStudio and project director. "Students want to use annotation not only for class work, but also for their own writing," he says. Faculty using Annotation Studio in the classroom, such as Kelley, have been a central part of the development team, providing feedback and suggestions to improve the tool.

A white paper on the project describes the Annotation Studio team as "a combination of classroom instructors, designers, and software developers who meet throughout the academic terms, often with student users, to engage in a collaborative design process focused on end users from the start. Feedback from students and faculty using the prototype has continuously informed software development."

Engaging in the digital age

With the help of the NEH grant, Fendt, Kelley, Paradis and colleagues now aim to further develop the capabilities of Annotation Studio and to make the program broadly available. "We're sharing everything," Fendt says.

Other universities worldwide have already begun using Annotation Studio in their own courses, or have taken the code as the basis for their own projects — an indication that digital annotation fills a clear need. "Ten years ago, people struggled to read digitally, now some prefer it," Paradis says. "We want to return to people the capability of engaging with text — in a digital age."

Story prepared by MIT SHASS Communications
Editorial and Design Director: Emily Hiestand
Senior Writer: Kathryn O'Neill
Communications Assistant: Kierstin Wesolowski

Topics: Digital humanities   Comparative Media Studies/Writing

Foreign languages and literatures   Literature, languages and writing

Student life   Students

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Appendix 8

Credits

A Digital Humanities project of the scope of Annotation Studio can only be realized with many collaborators with a variety of expertise on different levels. One of HyperStudio's core functions was to provide a central organizing locus and ongoing project planning function to coordinate so many kinds of input. HyperStudio's concept of co-design and agile development has brought together colleagues, students, developers, and many others at all stages of development. Here's an incomplete list of those who contributed to the creation and implementation of Annotation Studio.

Annotation Studio Team

Jim Paradis (PI)
Kurt Fendt (Co-PI)
Wyn Kelley (Literature)
Suzanne Lane (Writing, Rhetoric, and Professional Communication)
Andreas Karatsolis (Assessment)
Jamie Folsom (Software Developer)
Rachel Schnepper (Outreach Coordinator)
Gabriella Horvath (Administrator)
Liam Andrew (Research Assistant)
Desi Gonzalez (Research Assistant)
Andy Stuhl (Research Assistant)
Evan Higgins (Research Assistant)
Performant Software (add. software development)
Thoughtbot, Inc. (add. software development)

Advisory Board

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John Unsworth (Brandeis University)
Elyse Graham (Stony Brook University)
Wyn Kelley (MIT)
Suzanne Lane (MIT)
Edward Schiappa (MIT)

Participating Instructors (selected)

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Ina Lipkowitz (Literature)
Mary Fuller (Literature)
Gretchen Henderson (Literature)

Helen Lee (Comparative Media Studies/Writing)
Joaquin Terrones (Literature)
Roberto Rey Agudo (Global Studies and Languages)
Kristof Magnusson (Global Studies and Languages)
Ellen Crocker (Global Studies and Languages)
Dagmar Jaeger (Global Studies and Languages)
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Elizabeth Choe (OEIT)
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Catherine Turner, University of Pennsylvania
Charlotte Nunes, Southwestern University
Christy Shaughnessy, Washington & Jefferson University
Colin Brown, Harvard University
Dawn Coleman, University of Tennessee
Domingo Ledezma, Wheaton College
Ethna Lay, Hofstra University
Gabriella Gangi, University of New Hampshire
Heather Klemann, Yale University
Ian Petrie, Centre for teaching & Learning, University of Pennsylvania
Jacqueline Doughterty, University of Pennsylvania
Jason Prentice, Boston University
Jessica Kubiak, Jamestown Community College
Jillian DeMari, Harvard University
Jody Gordon, Chris Gleason, Wentworth Institute of Technology
Johanna Tomlinson, University of Iowa
Kate Pantelides, Eastern Michigan University
Kim Vaeth, Bentley College
Laura Witherington, University of Arkansas, Fort Smith
Lisa Gordis, Barnard College
Maria Ester Rincon Calero, Boston College
Marisa Parham, Amherst College
Mary Isbell, University of New Haven
Mary Lewis & Charles Clavey, Harvard University
Melanie McNaughton, Bridgewater State University
Melanie Peron, University of Pennsylvania
Michael Ullyot, University of Calgary, Canada
Peter Jones, Queen Mary, University of London
Rachel Arteaga, University of Washington
Rachel Chaffin, University of Pennsylvania

Rob Hardy, Carleton College
Sam Fallon, SUNY New Paltz
Sarah Horowitz, Washington and Lee University
Shannon Reed, Cornell College
Tom Denton, Dutchess Community College
Vimala Pasupathi, Hofstra University
Winter Werner, Wheaton College
Zoran Kuzmanovich, Davidson College

At High Schools
Nicole Carter, Carthage Junior High School (MO)
Brian Krause, Mira Mesa High School (CA)
Elizabeth Lilly, Oakmont Regional High School (MA)
Derek Wright, Alpharetta High School (GA)
Allen Drinkwater, Wakefield High School (MA)
Justin Ongley, New Milford High School (CT)