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Project Director:	Dr. Stephen C. Enniss, Eric Weinmann Librarian
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Folger Shakespeare Library/MITH and University of Oxford

Transatlantic Digitization Collaboration: Shakespeare Quartos Archive

Final Report and White Paper to the National Endowment for the Humanities (NEH)

A. Project Activities.

The Shakespeare Quartos Archive (SQA) was launched on November 16, 2009 to immediate acclaim in the online Digital Humanities and Shakespeare communities. In the first week, 2,803 visitors came to the site (See Appendix 1). Newspapers around the world (including stories in non-English language publications from Hungary, India, and Russia) covered the launch, and Digital Humanities blogs and twitter feeds discussed its importance. For a selected bibliography of coverage, see Appendix 2. Although SQA is clearly not the first online archive of digital images and transcripts of a set of important cultural documents (nor even first such archive of Shakespearean material), it is the first to include nearly every extant pre-1642 copy of a play alongside deeply tagged TEI transcripts, and the prototype web 2.0 interface for accessing the images pushes the boundaries of what a web archive can be.

This section outlines activities during the grant period in various project categories: *Partners and Goals, Images, Transcriptions, User Interface, Server Management*. For more about our specific accomplishments, see Section B below.

Partners and Goals. Eight institutions from the UK and the US, each with different forms of expertise collaborated across great distance and widely disparate time zones to build this first phase of the archive. Our aim was both a) to demonstrate how early printed editions of *Hamlet* could be compared and analyzed if fully transcribed and presented in a single-user interface; and b) to create a single online collection of page images for at least one copy from every pre-1642 edition of the plays. For more on the Grant Products, see Section G below.

Images. Project performance was affected by unanticipated issues related to image collection from participating institutions. Although the final grant product was not adversely affected, the issues we faced are worth addressing in some detail.

Resolution, file format, and size. We began our work with most of the quartos already filmed. The now defunct company Octavo had, in the mid to late 1990s, photographed the quartos held by the partner institutions with the intention of embedding them in PDF files and distributing them on optical media. We assumed that most if not all contributed images would be alike in resolution, file format, size, and status due to their being created as part of a project executed by Octavo using common staff and equipment at four of the six participating institutions (Folger and Huntington shot their own images). In the end we got a variety of formats (some tiff, some jpg); we got some masters (uncropped, not color-corrected although color bars and rulers were present) and some as publication-ready (cropped, color-corrected, with a neutral background); source image sizes ranged from 5 mb to 229 mb.

Image Delivery. With six institutions contributing images, some of which were created ca. ten years ago, a variety of delivery mechanisms were anticipated. What we did not anticipate were the problems we had with each:

- **Submission via DVD.** Copying large files from DVDs can be very slow, as much as minutes per file for the largest sized images. Further, paper labels on one institution's DVDs prevented one drive from copying at all.

- **Submission via FTP.** Some images were corrupted in transmission and had to be re-sent. Zipping up image sets helped avoid corruption, particularly in large sets of image tiles.
- **Submission by portable hard drives.** A drive was lost in the mail.
- **Storage on portable hard drives.** A hard drive failure resulted in lost time (although no lost data). Budgeting for, and early availability of, networked storage and server space would have mitigated some of these problems.

File naming. Filenames followed the early MS-DOS convention (eight characters followed by a three character extension) which, while useful for backwards compatibility in the 1990s, were meaningless without a chart to link the eight-character name to the document. We therefore developed a file-naming scheme (detailed in Appendix 8) and asked partner libraries to rename their files accordingly. There remained, nonetheless, some inconsistency in the way the libraries interpreted our guidelines (one occasionally exchanged the letter “o” for the numeral zero).

Zoom. For viewing the images we had originally intended to use “panojs,” the very lightweight “deep zoom” program developed by Dan J. Allen and hosted on Google Code. Panojs works by first cutting the source images into 256x256 pixel tiles at various resolutions so that only the tiles from the region on the users screen need be loaded. We used Allen’s Python script for generating these tiles, accepting the script’s naming convention of adding three numbers to indicate the position in the image and zoom level to which the tile corresponds. The result was that we now had not only a set of very large source images, but for every image, a folder of many tiles. Transferring these files reliably across intercontinental networks proved very difficult, and we strongly recommend that future projects generate tiles directly on the production server if at all possible. When it became clear that we needed to support Internet Explorer 6, MITH decided to adapt the much more fully featured (but therefore more complicated) OpenLayers interface which natively provided cross-browser functionality for many of the features we wanted (both implementations are visible in our subversion repository hosted at peach.umd.edu/svn/quartos). Unfortunately, although OpenLayers accepts a number of tile formats, panojs was not one of them. Rather than retreading the difficult and error-prone process of tiling and transferring the files, we wrote a protocol for OpenLayers allowing it to accept tiles generated by the Panojs script. This protocol is now published on the blog for the NEH-funded TILE project: (<http://www.tileproject.org>).

Jpeg2000. It should be noted that in a future phase of the project we plan to convert the interface from a system built on pre-generated tiles to one which generates tiles “on the fly” from a Jpeg2000 image using the Los Alamos National Laboratory’s Djatoka. Hugh Cayless of New York University has written a protocol for OpenLayers that allows the program to use dynamically-generated tiles from Djatoka, and so it will be an easy matter to simply replace this part of the backend code and dispense with tiles altogether. We did not begin with this approach because Djatoka requires a relatively less common server setup and demands the ability to install server level applications; unfortunately, securing the server on which to mount the images and interface took much longer than anticipated, and so we did not feel confident making these assumptions until it was much too late.

Transcriptions. Images were sent to the team at Oxford who contracted with an Indian company (Stylo Graphics) to generate the transcriptions that they then encoded in TEI. As the project developed we realized the need to distribute some of the work to partner contributing institutions at which point Folger and British Library stepped forward to take on encoding of manuscript additions and other copy-specific details that fall outside the text block. Additionally, the lack of and need for stable guidelines for this sort of transcription became abundantly clear. We count

the establishment of a preliminary set of guidelines for TEI-based transcription of copy-specific details as one of our key accomplishments. See Section B below for more on this.

User interface. The team at MITH developed several versions of the interface and submitted them for evaluation, first at informal sessions at MITH and the British Library and then at more formalized sessions at the Shakespeare Institute in Stratford-on-Avon and with a web evaluation contractor hired by the British Library. Throughout the process a number of issues came up related to URIs, JavaScript choices, browser compatibility, etc.

URIs. The earliest prototype version of the interface was demonstrated and critiqued by those present at the Advisory Forum in June 2008, with many expressing excitement over the potential of the prototype, but also strong feelings that however exciting the interface might be, the content should be entirely separable from it to ensure continued access to the files. This we had always planned to do, and the result is it is now possible to access all of our digital assets at stable URIs without using the interface.

YUI vs. jQuery. The interface was designed using the YAHOO User Interface (YUI) JavaScript framework. The framework was selected because, when we began work on the project, it was one of the best-documented JavaScript frameworks and seemed best able to fit into the object-oriented programming paradigm the team wished to follow. Furthermore, unlike other popular frameworks such as jQuery, the syntax of YUI is very similar to that of native JavaScript, and so the team at MITH felt future project partners could more easily extend it. While we still feel the reasons for selecting YUI were good, in retrospect jQuery may have been a better choice. In the intervening time between the start and conclusion of the grant period, jQuery has clearly become the most used JavaScript framework and so our worries about the extensibility of code written in the framework were probably unfounded. Moreover, the dramatic shift in syntax from native JavaScript to jQuery may have better encouraged developers to use framework-provided, cross-browser compatible functions that would have adapting the code for IE6 easier. MITH is currently in the process of rewriting much of the interface code in jQuery (as part of an effort to generalize and package the interface for other online editions).

Browser compatibility. We had originally intended that the prototype would be full-tested only on Firefox as it is open source and available on all major operating systems. However, late in the development process, members of the development team pointed out that their own institutions had only Internet Explorer 6.0 installed in the public labs and reading rooms. As a result, in the last two months of the grant all development was focused on making the interface functional on this browser as well as more modern ones.

Server management. The version control software Subversion, hosted on MITH's servers, was used to manage parallel development on the interface by several developers and allowed us to roll back to earlier versions if a particular line of development introduced unanticipated problems. Although earlier availability of server space would have helped at each stage of the project, from image delivery to zoom-tile preparation and interface coding, close communication and effective collaboration with IT staff at Oxford University helped immensely in getting the site set-up.

Once all of the images, tiles, XML files, and code were loaded on the server, the interface was evaluated a final time by staff at Oxford and the Folger unconnected with the project. Last minute adjustments were made, and, after a brief phone conference to confirm all partners were pleased with the result, we launched the site on November 16, 2009 through a traditional press release, blog posts on partner sites, and (arguably most effectively) via twitter postings by project partners.

B. Accomplishments

Collaboration. We count among our chief accomplishments the successful collaboration among many institutions, and on a tight time frame. Contact between key partner institutions (the University of Oxford, the Folger Shakespeare Library, MITH, and the British Library) was established early in the project. Regular conference calls were organized by the Folger and held approximately once a month, ensuring continual communication among the partners. A publicly-available wiki was established to share conference call minutes and document decision-making processes and workflow, and a password-protected file-sharing and calendar area was created for partner institutions. Communication with other project partners (the Shakespeare Institute, the National Library of Scotland, Edinburgh University Library and the Huntington Library) was established as appropriate for their different contributions. Those contributing images were contacted as soon as possible to make sure images were delivered in a timely fashion. Most work was organized and coordinated remotely, with only a few face-to-face project meetings: the Advisory Forum at Oxford in June 2008; a planning meeting held in coordination with the TEI 2008 meeting at London in November 2008; and a planning and implementation meeting held in coordination with the usability testing at London and Stratford-on-Avon in March 2009. Along with the scheduled and grant-funded project meetings, a number of conferences brought various members of the project team to the same geographical location and important business was often conducted at conference breaks or lunches. We end the project very satisfied with the collaboration, pleased that the solidification of cross-institutional relationships is one of the most useful outcomes of this project.

Encoded transcriptions. Alongside the images, the team at Oxford University created a set of TEI-encoded diplomatic transcripts of every image set in the collection, based on preliminary outsourced transcripts created by Stylo Graphics. In these editions the printed texts are transcribed as they stand, with all additional manuscript annotations also transcribed, and information supplied about other paratextual aspects that fall outside the printed textblock. Given that TEI does not provide many options outside of the header area for copy-specific transcription, and given that material aspects of these quartos are as important as textual aspects, a set of guidelines were developed for transcription of such copy-specific information within TEI, regularizing the encoding of such issues as manuscript markings, damage and repair, stamps, bindings, bookplates, and other marks of ownership. These guidelines have been made public on our website and it is hoped that they might inform future TEI-based projects working with similar textual objects (see Appendix 7). Transcriptions are used in several ways in the interface. Viewers can view a textual approximation of any page by viewing an HTML transformation of the transcript generated by an XSL stylesheet written by a team member at the Folger Library. The XML has also been imported into a relational database by the team at MITH and can be searched using an advanced and impressively speedy search tool included in the interface. Finally, we have also used the popular Diff algorithm to collate every transcript in our set to every other one and users can examine this collation in an interface that highlights all of the differences between any two copies of the five pre-1642 editions of *Hamlet*.

User Interface. Following the best practices of digital archives today, the Shakespeare Quartos Archive interface provides direct access to all of the assets in the collection via a set of stable URIs. Users can therefore access all of the images and transcripts in the collection without using our prototype interface should they chose to do so. However, those users who do test the sites' functionality are generally pleased. Whitney Trettien, a blogger for HASTAC, described the interface as "a clean workspace that acts more like an application [than a simple website]." Constructing a web *application* was precisely our intention, and we have succeeded in building one with most of the functionality described in our grant proposal.

As promised, users can view any number of quartos at the same time by opening them into draggable and resizable “panels” (similar to the “windows” in Microsoft’s eponymously named operating system). These panels include navigation controls for moving back and forward through the page images in the same order the pages appear in the codex; or, using a dropdown selection menu, users can “jump” to a particular page of interest, navigating via original collational signature marks or via sequential image numbers for each double-page spread. Once a page has been selected, users can zoom into the image quickly (and without using any more computer memory or bandwidth than necessary) using an adaptation of the popular OpenLayers map interface the team at MITH created especially for the project. The pages can also be made translucent in order to compare one image to an image positioned just below it, thereby permitting a quick visual collation of variant printings or editions in addition to the diff-based textual comparisons also available on the site.

User interactivity. We have also included a set of “web 2.0” tools that allow greater interactivity between users and content. Registered users can, for instance, “cut out” pieces of the page image to create small pieces of multiple pages, from any number of quartos. These pieces each get a stable URI that can be emailed to another user or used to download a cropped image for inclusion in, for instance, a scholarly essay. Users can also annotate page images of each quarto, saving these annotations into sets that can be kept private, or made available publicly to other registered users. Users can also create simple “labels” that might be used as a kind of on-screen note-taking environment or for captioning images on-screen. The ability for partner institutions to moderate user-supplied data was added at a late date, another unanticipated but welcome addition to the user interface.

Finally, registered users can create “exhibits” (a saved state of the interface) which might consist of panels positioned at particular positions relative to each other, cutout pieces of pages, or labels captioning particular pieces of interest. These exhibits, as well as annotation sets, can be shared with other users.

C. Audiences and Evaluation

From the start we understood our primary audience to include advanced editors and teachers in the area of Shakespeare studies. But we also reached out specifically to high school teachers, to university students, to theater professionals, and to members of the digital humanities community. Proposed interface features were presented to members of these audience communities, and final choices were made based on supplied feedback.

Audiences of Scholars. The Folger Shakespeare Library’s on-site visiting Reader population came from 20 countries in 2008-2009, with eight countries represented among our Long-term and Short-term Fellowships. Since December of 2008, the Folger has opened web access to a database of digital images of collection material, now counting over 30,000 images, and including cover-to-cover page images of 218 of the library’s pre-1642 Shakespeare Quartos. Similar activities and outreach could be described at each partner institution. The Shakespeare Quartos Archive represents therefore a continuation and expansion of traditional outreach by the member libraries—in person and via electronic resources—to an already international scholarly community. Through the SQA *Hamlet* interface hosted by Oxford University, we are now for the first time providing a single online portal to both images and transcriptions of the early printed holdings of our multiple institutions. And through the *Shakespeare in Quarto* interface hosted by the British Library, scholars for the first time can access online at least one copy of every pre-1642 edition of the plays of Shakespeare. Editorial and collation work enabled by this project that in the past would have required Reading Room access on multiple continents, or access to low-resolution printed black-and-white photographic or microfilm-based reproductions.

Scholarly Evaluations.

See Appendix 3 for a participant packet and final report on the June 6, 2008 Oxford University-hosted invitational Advisory Forum.

See Appendix 4 for a report on the March 5, 2009 University of Birmingham Shakespeare Institute-hosted *Shakespeare Quartos Archive Usability Discussion*. Participants included ca. 15 - 20 faculty and post-graduate students of the Shakespeare Institute.

See Appendix 5 for a report on the March 9, 2009 *Report British Library – Shakespeare Quartos Usability testing*. Of particular relevance here are the reports by one of our testers, a “Male, 25. Postdoctoral research fellow. Teaches Shakespeare and textual history. Interested in Hamlet and the quartos.”

See Appendix 6 for a report on the March 27, 2009 Folger Shakespeare Library-hosted *Shakespeare Quartos Archive Usability Study*.

The Folger Shakespeare Library is in the planning stages for a proposed scholarly seminar in 2010 to focus on possible SQA uses, potential SQA interface improvements, and the relationship of the SQA to other Shakespeare-related digital humanities projects.

Audiences of Teachers and Students. The possible classroom uses of the Shakespeare Quartos Archive were considered from the outset. Access to the early printed text of *Hamlet* can be extremely useful in teaching the play, augmenting the use of modern edited editions with facsimiles of original editions. Further, these physical copies have been marked up by previous owners, lovingly repaired, ornately re-bound, dismantled and page-mounted, etc. Therefore the cover-to-cover digitization (including boards, spines, and all endpapers) provides important opportunities to teach textual reception history and book history. Some of the interface features were specifically designed with classroom instruction in mind. For instance, exhibits can be created, where an instructor might crop and label selected passages from multiple quartos, arrange them as desired on the screen, saving the exhibit for later examination by other registered users.

Teacher and Student Evaluations.

See Appendix 4 for a report on the March 5, 2009 University of Birmingham Shakespeare Institute-hosted *Shakespeare Quartos Archive Usability Discussion*. Participants included ca. 15 - 20 faculty and post-graduate students of the Shakespeare Institute.

See Appendix 5. Note the reports by one of the testers present in London, a “Female, 22. BA (Hons), now MA student with a keen interest in Hamlet. Wants to work for a Shakespeare theatre company.”

See Appendix 6. Among our participants were staff of the Folger Education Division; an undergraduate student member of a Folger Seminar; and a secondary school teacher who is a past participant in an NEH-funded Teaching Shakespeare Institute.

Audiences of Theater Professionals and Performance Attendees. There has been an increase in recent years in dramatic productions and published acting editions based explicitly on early printed versions of Shakespeare’s plays, including a number of performances of the so-called “bad quartos” which include the 1597 printing of *Romeo and Juliet*, the 1600 *Henry V*, the 1602 *The Merry Wives of Windsor*, and the 1603 *Hamlet*. As an aid for creation of a prompt copy or performance playscript, The Shakespeare Quartos Archive *Hamlet* interface provides the ability to directly compare any two of the 32 copies present, with word and line changes highlighted. Text can be easily downloaded or viewed in a printer-friendly format. Additionally, a “Cue Line” feature provides for actor access to a cue script providing for any character’s lines to be printed out or downloaded along with the lines coming directly before his or hers.

Theater Professional Evaluations.

See Appendix 5. Note the reports by one of our London testers, a “Male, c.30. Director in residence at the Young Vic, also worked for the RSC.”

The Folger Theatre 2009/10 season includes a production of *Hamlet* from April 21 – June 6. The SQA will be demonstrated for Director and Dramaturg, who will be invited to provide comments and experiment with using SQA in conjunction with production planning. In addition, a demonstration of the SQA will be provided to theater-goers attending a *Hamlet* production during a pre-performance presentation.

Other Audience Outreach and Evaluations. In addition to the interim evaluations described above targeting specific audience types and held for the most part during the course of the grant period, team members also engaged in a variety of outreach efforts through a variety of other venues:

April 8, 2008 at MITH. “Introducing the Shakespeare’s Quartos Project,” by Neil Fraistat and Doug Reside of MITH and Richard Kuhta and Jim Kuhn of the Folger.

November 7, 2008 at TEI: Supporting Cultural Heritage Research and Members’ Meeting, King’s College, London. “‘Look here, upon this picture:’ the Shakespeare Quartos Archive and Image-based Variorum Editions in TEI,” by Doug Reside of MITH.

March 31, 2009 at MITH. “The Shakespeare Quartos Archive: A MITH Research Update,” by Doug Reside and Grant Dickie of MITH.

June 2009 at Digital Humanities 2009. “The Shakespeare Quartos Archive and TEI-P5,” by Doug Reside.

July 20, 2009 at Oxford University Computing Services. “TEI@Oxford Summer School: an intensive introduction to the TEI” included a presentation to participants on SQA by Pip Willcox of the Oxford Digital Library.

August 11, 2009 at Royal Shakespeare Company, London. “RSC Summer School 2009” included a presentation to participants on SQA by Moira Goff of The British Library.

Fall 2009, book chapter accepted for publication. “More than was Dreamt of in Our Philosophy: Encoding Hamlet for the Shakespeare Quartos Archive,” by Judith Siefring and Pip Willcox (of the Oxford Digital Library). Accepted for inclusion in the forthcoming *Digitizing Material Culture, From antiquity to 1700*. Eds. Brent Nelson & Melissa Terras. Toronto & Tempe: Medieval & Renaissance Texts and Studies.

November 13, 2009 at the Conference and Members’ Meeting of the TEI Consortium, Ann Arbor, MI. “The Shakespeare Quartos Archive,” a Poster Session by Jim Kuhn of the Folger.

November 14, 2009 at the Conference and Members’ Meeting of the TEI Consortium, Ann Arbor, MI. “A Four-Layer Model for Digital Multimedia Editions,” a Late-Breaking Submission by Doug Reside of MITH.

April 8, 2010 at the Renaissance Society of America Annual Meeting, Venice, Italy. “‘A hawk from a handsaw:’ Collating Possibilities with the Shakespeare Quartos Archive” by Jim Kuhn (of the Folger) as part of the panel “New Technologies and Renaissance Studies III (A): Texts in Motion (I), Collating Variant Manuscripts, Editions, and Impressions.”

D. Continuation, work to be done, and long-term impact of the project.

Further funding will be sought to continue the project. As any web application developer working today is well aware, the numerous inconsistencies among the implementation of JavaScript in various browsers make full cross-browser functionality a difficult goal. The result of establishing browser-compatibility as a major goal late in the development stage is that, despite

our many achievements, there remain a few pieces of the interface we intended to build that remain undone and are slated for completion in other projects at MITH, or for later SQA phases:

Magnifying glass: We had originally intended to build a tool which would allow users to use a draggable box that would replicate the functionality of a traditional magnifying glass, permitting one to zoom in on a small region of an image while leaving the rest of the image at the same size. This functionality was built, but did not port easily to the OpenLayers code. We ultimately decided that the so-called “deep zoom” capabilities of OpenLayers (the ability to load, at very high resolution, only the portions of the image currently viewed by the user) was among the best provided by a truly open source program and the benefits of using this code outweighed our desire for the magnifying feature. We do plan, however, to retrofit the interface with the feature as we continue to develop the interface for other projects at MITH.

Statistical information about the texts: We had intended to create a tool that would display stylistic information about each quartos (graphs detailing the number of words per line, tag clouds of word frequencies, etc.). There are, however, a number of very good open source applications already on the market with these capabilities, however, and so, rather than replicate these functionalities, we decided to simply link to these pre-existing tools and suggest that users use them with our XML files.

Linking text to image at the word level: In our proposal we suggested that we would “link page images to text.” This has been accomplished at the page level. However, we had originally intended to link every word in the transcript to its coordinate position in the image to enable among other things the highlighting on an image of searched-for text. To this end we built a prototype application to semi-automate this process. Unfortunately, the tagging and coordinate-mapping process, particularly for manuscript transcription, took much longer than anticipated, and so, even with the tool (which could usually only achieve about 70% accuracy before correction), linking text to image at this level proved unfeasible. However, as discussed in the last section of the document, the tool will continue to be developed as part of the NEH-funded TILE project and our hope is that the improved version of the software will allow us to go back and finish this linking. Other relevant enhancements on the list include further development of the HTML view of the transcriptions and addition of “through-line numbers” to better enable users to compare these transcriptions with other published editions of the play.

Search: At present, search requires a user to enter whole words. That is, searching is not available with auto-truncation, variant spellings, or variant word forms. Further, the depth of TEI tagging is not fully exploited by the search at present. For instance, the tagging could support limiting a search to copy-specific manuscript additions, paratextual elements, or specific former owners, although these features have not yet been enabled.

User-supplied information: Features of public annotation sets that could be extremely useful in the classroom or for collaborative editing include: threaded discussion; the ability to make a private set visible to a number of invited participants; the ability to provide stable URIs for exhibits (already available for annotation sets). These features will be developed under future SQA phases.

Regardless of the outcome of future funding requests, the sites now online will continue to remain available. Collaborative efforts among partner institutions will also continue in the future. In fact, plans for additional collaborative projects were begun during the grant period.

E. Grant products.

In conclusion, our aim was both a) to demonstrate how early printed editions of *Hamlet* could be compared and analyzed if fully transcribed and presented in a single user interface, and b) to create a single online collection of page images for at least one copy from every pre-1642 edition of the plays; while c) leveraging the individual separate efforts of each partner institution to a higher level of service to our shared audiences, via a collaborative enterprise.

- a. The main site (www.quartos.org) now includes 32 image sets and transcriptions of the five pre-1642 editions of *Hamlet*. The site includes copies owned by the Bodleian, British Library, Folger, Huntington, National Library of Scotland, and University of Edinburgh. *Hamlet* texts are presented in a prototype user interface designed by the Maryland Institute for Technology in the Humanities. Transcription was overseen by staff at the Oxford Digital Library, with help from Folger and British Library staff and interns. We had help in evaluation and planning from many Folger staff, readers, teachers, and friends, from faculty and students at the Shakespeare Institute of the University of Birmingham, and via an observed usability test by the Web Usability Partnership under contract with The British Library.
- b. The British Library's companion site "Shakespeare in Quarto" (www.bl.uk/treasures/shakespeare/homepage.html) was launched in 2004 with page images but no transcriptions for each pre-1642 quarto edition of Shakespeare's plays owned by the British Library. As part of SQA, this site was updated so that it now includes at least one image set per edition of each of the 21 Shakespeare plays printed in quarto. New digital images for this portion of the project were provided by the Bodleian, Edinburgh, Folger, and National Library of Scotland.

Meanwhile, in December 2008 and during the period of the SQA grant, the Folger Shakespeare Library provided online public access for the first time to cover-to-cover digital images of 218 pre-1642 Shakespeare quartos. For access, see: www.folger.edu/Content/Collection/Digital-Image-Collection/. With this work in place, over half of the extant Shakespeare quartos have now been digitized (442 of the known 777 copies). It is hoped in future that this work, along with digitization at other partner institutions, can make its way into the shared online Shakespeare Quartos Archive.