How can educational technology facilitate student engagement with online primary sources?: A user needs assessment

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Introduction

With the wealth of digital collections currently available, ranging from Paul's Epistles on papyrus to news footage of the Watergate hearings, greater opportunities exist than ever before to integrate primary sources into humanities teaching and learning at the university level. Recent studies, however, indicate that collections of online primary sources are underutilized despite their extraordinary promise for use in the classroom because these collections often lack the tools necessary to accommodate learning preferences and pedagogical goals. Finding ways to bridge this gap with educational technology is essential as digital collections propagate, Web 2.0 technologies pervade students' lives, and work with primary sources becomes an increasingly important component of university humanities curricula.

To help address this need, the authors are developing a digital educational tool to support pedagogical objectives and enhance student engagement with online primary sources. They are employing a user-centered design methodology to ensure that the complex needs of users are understood and addressed. Thus the tool's functionality will be determined by a user needs assessment of its primary audiences, humanities students and faculty at the University of Colorado at Boulder (UCB). The authors believe this study will result not only in a user-centered tool, but also contribute to the growing body of research on user needs for effective work with online primary sources in university-level humanities education.

This article reports the findings of the user needs assessment, specifically discussing learning preferences, digital educational tools, traits of learner-centered assignments, and primary sources. It elucidates the major themes from these data and concludes by offering potential directions the digital educational tool for work with online primary sources may take.

Literature review

This study draws upon literature related to educational technology and online primary sources. First, an overview of research on students' current technology usage is presented, highlighting opportunities to use technology more effectively to benefit the learning experience. Second, the critical role that online

primary sources play in humanities education and the reasons for their underutilization are reviewed to uncover areas in which the delivery of these important resources could be improved.

Educational technology and the learning experience

Some educational researchers studying the impact of technology on students' learning preferences have identified characteristics that they attribute to "digital natives", a phrase coined to describe individuals who have grown up with information technology. Digital natives prefer multi-tasking as well as receiving and processing information quickly. They also favor audiovisual over textual information and are proficient in creating new multimedia by mashing up other sources. They seek and process information in a non-linear fashion, preferring "non-associational webs of representation" such as hypertext (Dede, 2005, p. 7). Additionally, digital natives function well not only in a networked, communal learning environment, but also working individually. Furthermore, they thrive on experiential learning, that is, immersion in an environment in which they can act, experiment, and learn by doing (Dede, 2005; Oblinger, 2003; Prensky, 2001).

While there is some debate about the accuracy of this characterization (Bennett et al., 2008; Bennett and Maton, 2010; Brown and Czerniewicz, 2010; Helsper and Eynon, 2010; Kennedy et al., 2010), numerous studies confirm that technology is an important component in students' academic lives. One of the most comprehensive and long-running of these investigations, the ECAR Study of Undergraduate Students and Information Technology, surveyed 36,950 undergraduate students from US institutions of higher education in 2010. This study found that students rely heavily upon a few key technologies – library websites, presentation software, learning management systems, and spreadsheets – to accomplish their academic work. Interestingly, only 30 percent of the students surveyed used social networking sites for this work and less than a quarter of them used e-books or accessed lectures captured on podcasts or video (Smith and Caruso, 2010).

Perhaps one of the most revealing findings of the ECAR study relates to students' perceptions of technology's benefits in an academic setting. Seventy percent of the students surveyed in 2010 agreed with the statement, "information technology (IT) makes doing my course activities more convenient", a finding that is supported by every previous ECAR study since 2004. By contrast, only half of the participants agreed with the statement that IT improves their learning, while a mere third agreed that they get more actively involved in courses that use IT (Smith and Caruso, 2010).

These statistics highlight technology's unfulfilled potential to become a cognitive tool that advances students' critical thinking skills, rather than simply making tasks associated with traditional modes of learning more convenient. Ideally technology would be leveraged to engage students in creative and critical thinking; however, most students currently "'learn from' technologies as they might have traditionally 'learned from' textbooks … " (Campbell et al., 2010, p. 507). Maximizing technology as a successful learning tool is easier said than done and requires both a learner-centered focus and an understanding of productive pedagogical practices (Lowerison et al., 2005; McCombs, 2000; Tamim et al., 2011).

Understanding the principles of constructivism may be an instructive way to approach effective educational technology design. This learning theory asserts that students construct knowledge from experience, solving "meaningful and realistically complex" problems while interacting in a social context (Tam, 2000, p. 52). In other words, learning occurs when students undertake "authentic activities" that

have real-world relevance and require them to solve ill-defined, multifaceted problems through collaboration (Woo and Reeves, 2007). Constructivism "shifts attention from instruction as the imparting of knowledge to instruction as the guidance of socially-based exploration in intellectually rich settings" (Tam, 2000, p. 56).

Educational technology can support key components of constructivist learning theory – authentic tasks and interaction – in several important ways. First, it can simulate events that students could not otherwise experience due to space or time, such as the Battle of Verdun. Second, educational technology gives students full control over the learning environment so that they can better understand the interplay between the different forces acting upon this environment. Third, it has the power to bring students together with domain experts or other students from around the world to foster interaction (Winn, 2002). Most relevant to this investigation, however, educational technology can provide access to the wide variety of materials, such as raw data and primary sources, which students require to successfully accomplish authentic tasks (Tam, 2000).

Online primary sources in humanities education

Much has been written about the crucial role of primary-source material in humanities, and especially history, curricula at the undergraduate and secondary educational levels (see for example Lee, 2010, pp. 78-80; Malkmus, 2010, pp. 414-416). A recent survey of 627 history faculty, for example, found that they consider primary sources an essential component of teaching at the post-secondary level (Malkmus, 2010). Indeed, the use of online primary sources in the classroom is considered fundamental to current pedagogical approaches in the humanities that encourage critical thinking and inquiry-based, constructivist learning. Beyond the content they provide, they promote reading, writing, and information literacy across the curriculum (Bloom and Stout, 2005). Historical thinking in particular is facilitated through direct involvement with primary sources, as they encourage students to engage actively in the construction and interpretation of history (Koehl and Lee, 2009; Tally and Goldenberg, 2005; Winkler, 2002). Lee and Clarke (2003) explain that: "[t]he nonlinear shape of the web can serve as a lever to encourage students to deal with the multiple sequences, voices, outcomes, and implications of historical narrative (p. 3)." Thus the large-scale digitization of cultural heritage collections potentially offers an extremely valuable resource for teaching and learning in these disciplines.

Digital primary sources offer many distinct advantages over their analog counterparts. The major benefits are that they are more accessible, searchable, flexible, and easily manipulated than nondigital formats. They also allow maintenance of the documents' archival context, addition of more description and interpretation, and work from a variety of archival collections rather than pre-selected documents:

Instead of relying on only one perspective, or set of documents, students using the internet now have the potential to visit archives across the county, or indeed internationally, to see various documents on any given subject (Eamon, 2006, p. 306).

In a year-long study of history undergraduates, Kelly (2000) discovered that working online encouraged students to focus on the meaning of the sources and make more complex associations among them than they did using print resources. He also found that online primary sources fostered recursive reading and original thinking about the past.

Although collections of digital primary sources constitute an extremely rich pool of materials for instructional use in the humanities, these resources remain largely underutilized. Harley (2007a, b) conducted a key study with humanities and social sciences faculty about their use and non-use of digital resources, in undergraduate teaching in part to explore this issue. The study identified various barriers to use, including digital resources not meshing well with faculty teaching approaches; difficulties finding and selecting appropriate resources for classroom use; and the challenges of managing, maintaining, and reusing the resources. These issues are magnified by the faculty's lack of time and awareness of available resources. It is worth noting that language and literature as well as history faculty – arguably the disciplines that stand to benefit the most from online primary sources – were among the least likely to use them in the classroom (Harley, 2007a, b). In keeping with this finding, more than 90 percent of the 627 history faculty surveyed by Malkmus (2010) used primary sources to teach undergraduates, but most used print readers rather than online or archival resources for convenience; none of the subset of faculty interviewed searched the vast digital collections made available by libraries and other institutions. Not surprisingly, students are influenced by the faculty's example when it comes to digital collection use (Bass et al., 2008).

The limited discoverability and searchability of digital primary sources on institutional websites emerges as a major reason that many of these collections remain underutilized by both faculty and students. Google searching is the method students favor for finding information online for their studies, and it is also the most common way that faculty locate digital curricular materials (Harley, 2007a; Malkmus, 2010). Since so many faculty and students rely on Google, the decontextualization of sources, impenetrability of institutional databases, and sheer magnitude of the results represent major barriers to use. It is hardly surprising, then, that several studies have identified an increasing demand for granularity in searching both within documents and collections (Borgman et al., 2005; Harley, 2007a; Pattuelli, 2011).

The reality is that many online digital collections were not produced with teaching in mind – the organization of documents and navigational structures are not necessarily intuitive, and few tools are available to help mediate and interpret the documents (Eamon, 2006; Johnson, 2008). Many collections of online primary sources are of limited value due to the inadequacy of the design and interface for pedagogical purposes (Lee and Clarke, 2003; Swan and Locascio, 2008; Tally and Goldenberg, 2005). If many digital primary-source collections are difficult for faculty and students to find and use and frequently do not offer interfaces that adequately address pedagogical needs, authors assign responsibility, at least in part, to a "lack of systematic analysis of users' requirements" (Pattuelli, 2008, p. 636).

Methodology

This study was based on 21 semi-structured interviews conducted in December 2010 and January 2011 with UCB faculty, graduate students, and undergraduate students in humanities disciplines who taught and/or worked with primary sources in the classroom. UCB is a Carnegie Research University (very high research activity) with a range of master's and doctoral degree-granting programs in the humanities.

The authors decided on a user-centered approach to developing a digital educational tool for student work with online primary sources, based on feedback from humanities faculty who teach with primary sources and students who work with them. The assumption was that the tool would prove most helpful if it were developed with the target audiences' wants and needs in mind, with the goal of facilitating the

use of digital primary sources in the classroom. Given the qualitative nature of the study, purposive sampling was employed.

Participants were recruited via an e-mail invitation sent to relevant campus mailing lists, both interdisciplinary lists (for example, for medieval and early modern studies) and departmental lists for faculty, graduate students, and undergraduate students in multiple humanities disciplines. The participants represented a range of educational levels and humanities departments on the UCB campus as well as various degrees of familiarity with primary sources. They were rostered in seven humanities colleges and departments on campus: architecture and planning, classics, English, French and Italian, history, music, and religious studies, all of which offer doctoral-level programs. Given the study's focus on primary sources, history was not surprisingly the most heavily represented with seven faculty, five graduate students, and two undergraduate students. Rounding out these numbers were two faculty from English, one from French and Italian, and one from music; one graduate student from religious studies; and one undergraduate student each from classics and from architecture and planning.

Participants were categorized into three major user groups: faculty, graduate students, and undergraduate students[1]. Graduate students included both those who had taught undergraduates – either as the primary course instructor or as a graduate teaching assistant – and those who had not. The teaching activities discussed were primarily, but not exclusively, undertaken in courses at UCB. A total of 11 faculty, six graduate students, and four undergraduate students were interviewed.

The interview protocol included questions about students' learning preferences, digital educational tools, traits of learner-centered assignments, and uses of primary sources (see appendices A and B). At the conclusion of the interview, participants were asked to describe their "dream tool" for pedagogical use with digital primary sources and were then invited to contribute open-ended comments. They were also asked to give details about the types of classes they taught or took and to describe their experiences with incorporating primary sources into classroom assignments. Graduate students answered both the student and the faculty questions if they had teaching experience.

Transcripts were created for each interview conducted. One of the authors conducted the interview and took notes, while the other compiled the transcript. The notes and the transcript were then combined to form the final interview documentation. The authors then analyzed this documentation, categorizing the participants' responses by topic or quantifying data from responses in cases where this was illuminating (for instance, see Appendix A, questions 1 and 4). Responses to individual questions were examined both within user group and across all participants to identify commonalities and differences between faculty and students. Finally, the topics identified were compiled and quantified to determine the major themes. An analysis and discussion of the findings are presented below.

Results and discussion

The goal of the user needs assessment was to better understand students' learning preferences, uses of primary sources and digital educational tools, and the traits of learner-centered assignments, with the intention of applying that information to the development of a digital tool for student work with online primary sources. The authors designed a series of exploratory questions to elicit participants' experiences and thoughts within each of these categories, specifically asking what they found works well and what does not. The interview culminated with a brainstorming question about the desired functionality for the tool, with the purpose of allowing the participants to drive the design process. The

results of this study are generalizable beyond this intended use. The key themes related to student and faculty use of primary sources and educational technology gleaned from these results also contributes to the growing body of research on user needs for effective work with online primary sources in university-level humanities education.

Learning preferences

To begin a discussion about students' learning and technology preferences, participants read and responded to an excerpt from Chris Dede's (2005) article, "Planning for neomillennial learning styles." Dede characterizes this learning style as an affinity for:

- Fluency in multiple media and in simulation-based virtual settings.
- Communal learning involving diverse, tacit, situated experience, with knowledge distributed across a community and a context as well as within an individual.
- A balance among experiential learning, guided mentoring, and collective reflection.
- Expression through nonlinear, associational webs of representations.
- Co-design of learning experiences personalized to individual needs and preferences (Dede, 2005, p. 7).

The authors asked students which of these characteristics did or did not apply to them and asked faculty that, if any, of the characteristics they recognized in their students. The analysis of the participants' responses for each of characteristics is described below.

Dede's observation that students prefer a balance of experiential learning, guided mentoring, and collective reflection was the one that most strongly resonated with participants. Undergraduate, graduate, and faculty participants alike agreed that students prefer experiential learning, that is, immersion in an environment that allows them to act, experiment, and learn by doing. Students enthusiastically related examples of experiential learning activities in which they researched medieval dress, diet, and customs to reenact a banquet; chose an episode of an American television show to translate and produce in a foreign language; or explored architectural styles photographically by documenting a city center. Participants in all user groups also agreed that students respond well to guided mentoring. The graduate and undergraduate participants identified with a preference for collective reflection, although the faculty did not recognize this preference in their students as strongly as some other characteristics.

Two further characteristics, a preference for non-linear webs of representations and communal learning, were perceived variantly across user groups. Faculty identified students' partiality for non-linear webs of representations, but they recognized it more strongly in students than students did in themselves. Additionally, most of the undergraduate students said they favored communal learning approaches, but more than half of the faculty members stated that students do not like group work, with some explaining that students are concerned that individual effort is not recognized in this context.

Digital educational tools

Next the authors asked student participants what digital educational tools they used, and what they liked and did not like about each one. Faculty participants were also asked what digital educational tools they recommended to students and why, as well as what digital educational tools they observed students using. With these questions, the authors hoped to identify what functionalities participants

find useful, are lacking, or are problematic that potentially could be improved by the proposed tool. At the beginning of each interview, to give participants a common point of reference the authors provided them with a definition of "digital educational tool", broadly termed "any software application, website, computer game, mobile app, social networking site, course management system feature, etc. that supports or enhances students' ability to critically engage with course material, complete assignments, write papers, or collaborate with other students", but asked them to think broadly about the tools they use.

Many participants thought first of primary-source databases and websites offering or listing primary-source collections, rather than software tools. They mentioned 17 different databases or websites, with multiple participants citing subscription databases such as Early English Books Online, ProQuest Historical Newspapers, and JSTOR, as well as freely available resources like the Internet History Sourcebooks Project[2]. When asked what they liked most about these resources, most participants mentioned the convenience of internet access and the breadth of the materials available. On the other hand, they were disappointed by the fact that digital primary sources in their area of study are not all available at one access point and that even though there are many primary sources available online, many more still remain to be digitized. They also stated that they would like more complete metadata and better subject access in digital primary-source collections.

Almost all participants – faculty, graduate, and undergraduate alike – stated that students rely on Wikipedia for background information and then follow the links in the bibliography, or search Google to find primary-source material on their topics. Student participants, however, recognized the limitations of Wikipedia and said they approach the articles with healthy skepticism. An undergraduate student described an assignment that helped her understand these limitations – her class compared entries on an historical figure from Wikipedia, Encyclopaedia Britannica, and The Cambridge Dictionary of Irish Biography, followed by a discussion about what information was accurate and inaccurate, and how students might justify trusting one source over another. While many of the faculty dismissed Wikipedia as a problematic resource, three acknowledged that it can be an acceptable resource as long as it is used appropriately, as a starting point for research, and students are aware of its potential unreliability.

Eight participants across user groups mentioned using CUB's learning management system (LMS). Comments about the LMS were lackluster, with most participants using it as a repository to post or download files. Faculty members were aware that the system offers more interactive functionality, but had not had the time to learn how to use those features and also found the interface cumbersome to use. Participants in all three categories used PowerPoint for presentations, while faculty and graduate students also mentioned using bibliographic management tools, such as Zotero or Endnote.

Faculty reported experimenting with a handful of Web 2.0 tools for use in the classroom or integrating them into assignments, such as tweeting or texting as a supplementary discussion thread in class, or assigning students to write blog posts on a given theme throughout the semester. Several faculty members commented on the investment of time required to make effective use of these technologies.

With a few exceptions, participants used a small, relatively conventional set of tools to find material (databases, Wikipedia, Google), share files (LMS, Google Docs), facilitate writing (bibliographic management software), and make presentations (PowerPoint). As one faculty member pointed out, students tend to be selective with technology, mainly using tools that that are recommended by

instructors or librarians. Given the time limitations both students and faculty face, they are often hesitant to learn to use new tools unless the technology promises to be highly useful.

Traits of learner-centered assignments

The authors then asked faculty and students to discuss their experiences with successful and unsuccessful assignments to elucidate the traits of learner-centered assignments, with the goal of creating functionality in the tool to support effective teaching with primary sources. The following common threads emerged in their responses.

Successful assignments focused students' efforts on synthesizing information, thinking critically, and working with other students in meaningful collaborations. For example, in a medical history course, students chose a disease to investigate and read primary-source documents from three different time periods to learn how perceptions, treatment, and patient experience of that disease changed over time. This assignment required students to analyze and synthesize material from several different time periods, voices, and source types.

Many successful assignments contained an experiential component. One student described that not only researching but also reenacting scenes from the inquisition against the Cathars in France made the terrors of religious persecution in the medieval period more tangible. Students also vividly described their experiences working with original documents, which clearly fostered a sense of excitement and imparted greater meaning to the primary source and the time period under study. Faculty participants also reported observing the excitement students felt when encountering original sources. An English faculty participant, for instance, related:

Books have an aura, and old books incredibly so. They energize my students and locate [classroom] discussion very tangibly in front of them.

Additionally, participants related that learner-centered assignments incorporate an element of choice. Students are more inspired to learn when they are allowed to contribute to the direction of the assignment. They frequently mentioned, for instance, selecting their own topic as a hallmark of a successful assignment. Faculty also observed that giving students the freedom of choice creates a sense of ownership in the assignment that often translates into a strong motivation to delve more deeply into the material.

Since students tend to be more visually than textually literate, learner-centered assignments often leveraged this strength to further develop critical thinking skills. A faculty participant in foreign languages and literatures reported that providing students with an image related to an unfamiliar text can be an effective way to ease them into work with the text:

Students adore work with images, so [image-based] assignments are always incredibly successful, as is leading with audiovisuals to get them talking about [textual] materials in class. They need more guidance with texts. If you lead with images, you lead with their confidence base … They know how to articulate what they're seeing in an image.

This approach is particularly effective if the text under consideration is not easily intellectually accessible, for instance, if it presents different cultural values, historical usage, or typographic challenges. A faculty member in American history explained that students had difficulty reading and

analyzing primary sources that contain viewpoints they found offensive, such as pro-slavery or anti-feminist rhetoric. He helped students overcome this issue by using images; for example, he asked them to analyze a photograph of a Victorian female artist and describe why certain terms did or did not apply to her based on what they saw.

In addition, the faculty participants made several observations about how technology can contribute to the success of an assignment. They emphasized that technology is most effective when it contributes meaningfully to the work to be accomplished and is not simply employed for its own sake. For instance, one English faculty member taught a digital poetry class in which students use software to write a poem. In this assignment, the medium was an integral part of the creative process, and students learned to be creative with and think critically about the software. Inversely, several faculty mentioned that the gratuitous application of technology, such as incorporating flashy graphics into a presentation, can distract from learning objectives. Technology was also seen to facilitate successful assignments by minimizing the "busy work" involved.

Uses of primary sources

The authors were also interested in discovering what objectives faculty have in incorporating primary sources into the classroom, how students use primary sources, and what obstacles they encounter in this work. This information was gathered to identify features for the tool that complement current student work practices and ameliorate the challenges they encounter in working with primary sources.

In keeping with findings in the literature, faculty participants considered work with primary sources crucial to the undergraduate curriculum in the humanities. Their pedagogical objectives included teaching students how to: read primary sources critically; compare sources from different times, places, and perspectives; synthesize sources to make cogent arguments; and recognize recurring themes. Students also saw advantages to working with primary sources, including feeling a strong sense of connection to the past and a sense of discovery, as well as lending credibility to their arguments. In the case of digital primary sources, students appreciated the convenience of online access and the variety of sources available.

Students, however, encounter significant barriers in their work with primary sources. Initially, they had difficulty distinguishing primary sources from secondary sources and dealing with questions of subjectivity and intent in the documents. They also had problems finding primary sources relevant to their topics and wished that more were digitized. One barrier to finding relevant primary sources can be aggravated by the arrangement of the archive itself. A history graduate student pointed out that many important collections in the British National Archives were organized by "Victorians who don't think the way I do". Once they do find a source, students struggled with historical usage, variant spellings, paleography and typography, and foreign languages, as well as cultural values expressed therein that may be very different from their own. They often encountered documents without sufficient contextual information. One undergraduate elaborated:

I would love more background and context for the primary sources I work with. [Many online collections of primary sources] just present the source but give no sense of whether a letter, for instance, was delivered in middle of cholera outbreak. You have to figure out what year it was, who's writing to who, and what the letter is regarding in order to place it in time and with a [specific] person. You have to read many documents before you find the context you need.

When asked, students suggested the following measures to improve their experience. The most frequent requests were to offer more content online and make it easier to find. They also asked for better subject access and terminology support to identify relevant search terms. An undergraduate student described searching in vain for references to medieval dress codes until he discovered that the correct search term was “sumptuary laws”; such functionality would have simplified his task immeasurably. Students would also like documents to come with more contextual information and links to related secondary sources.

Ideal tool

The authors concluded each interview by asking the participants to describe their ideal tool for use with primary sources as well as by soliciting open-ended comments. Participants most often suggested functionality to make primary sources easier to find. Five participants described a metasearch feature that would bring all digital primary sources on a given subject, whether in freely available collections or subscription databases, together in one search. They also frequently requested faceted searching capabilities so that they could refine their searches based on criteria such as date, place, topic, and document type. One of the faculty participants, who teaches in both the History and English departments, described the desired functionality in-depth:

[I would like to see] a tool that would act as a telescope, so you could work at more depth in a certain direction of your choosing. You could add more and more focus until you reach a relevant source and narrow down what primary sources fit by place, time, and topic. Then once you are in the source, you could add more parameters, like battles, speeches, gossip, rumors, or other topics often included in the sources.

Several student participants stated that their ideal tool would include keyword searching, as well as automatic translations and transcriptions of primary-source documents.

Participants also put heavy emphasis on features to contextualize primary sources. They desired a tool that shows the relationships between individual primary sources and explains how each document fits into its historical context. Some participants suggested that this contextual information be presented in visualizations to provide alternative ways to understand these relationships.

Finally, participants described a tool with functionality that would ignite students’ imagination and foster a sense of excitement for conducting research. One American history faculty member mentioned creating a sense of adventure for students by allowing them to find their own paths through the primary sources like the “choose your adventure” novels. In addition, three participants suggested developing simulations that reproduce primary sources in distant places and times, such as in an ancient library in Alexandria, or simulations that allow students to experience the excitement of a research trip to a far-away archive. An undergraduate student in classics, for instance, suggested creating a museum tour simulation that would allow students to inspect physical artifacts, like portraits, that are related to the primary source under consideration.

Major themes

Several key themes related to student and faculty use of primary sources and educational technology emerged from the results of the user needs assessment described above. Firstly, students and faculty face significant challenges in finding and using online primary sources. Additionally, primary sources

present special opportunities for student engagement but often require context to make them sufficiently accessible and enhance student critical thinking. Lastly, educational technology is used selectively to save time but misses the opportunity to more fully support faculty pedagogical goals or contribute to the student learning experience.

The theme that emerged most prominently from the interviews was the significant challenge that participants encountered in finding and using online primary sources. They tend to be unaware of the full range of resources available and find it inefficient to search multiple databases and websites to identify relevant sources. The metadata are often inadequate to expose individual sources or sections within these sources by subject, time period, and geographical area with the desired granularity. Since similar concepts are expressed variantly across texts, keyword searching is haphazard. All of these issues make it difficult and time-consuming for faculty and students to select online primary sources for classroom use or research. Furthermore, once students find relevant sources, they struggle with challenges inherent to primary-source research: foreign languages, lack of context, document bias, historical usage, orthography, grammar, and paleography or typography, just to name a few (Lindquist and Wicht, 2007). Given these challenges, it is not surprising that time-strapped faculty rely on published readers to expose students to primary sources, or that students turn to Wikipedia for contextual information.

Despite the challenges of working with online primary sources, the faculty participants agreed that they present a unique educational opportunity for humanities students. Their major objectives in employing these materials in the classroom are to teach students how to find, read, analyze, and synthesize them as well as to compare documents from different time periods, geographic locations, and points of view. Faculty challenge students to consider multiple layers and meanings, show a real understanding of the time period, recognize recurring themes, and become better communicators through the study of primary sources. These pedagogical goals are consistent with the progressive skills set for history students elucidated by the History Learning Project at Indiana University (Diaz et al., 2008).

Another important theme relates to the special opportunities for student engagement that primary sources present. The interviews revealed two additional ways to enhance student engagement with primary sources. The first has to do with the type of assignments given. When asked about the characteristics of assignments that students found most interesting or motivational, the commonalities in the responses included an element of choice, experiential learning, and a sense of empowerment or ownership in the work, all of which support the assertion that authentic tasks excite student interest. Not surprisingly, students resist assignments they perceive as gratuitous or simply a regurgitation of facts. The second motivational strategy takes advantage of the characteristics inherent to original and facsimile primary sources that interest students. They derive great enjoyment from the powerful emotional and sensory connection to the past that they experience from working with original documents. While facsimiles do not offer the tactile experience of the originals, they do convey many of the visual qualities that appeal to students. Students reported favoring digital facsimiles for their availability, breadth of choice, and manipulability. A history undergraduate succinctly expressed the give-and-take between the excitement of an original and availability of a facsimile:

The romantic in me likes to look at the original, but then you are limited in what you can use.

Contextualizing sources, a related theme, is a necessary step to engage student interest in the substance of the material. Faculty offer a great deal of guidance to students by contextualizing primary sources,

whether by providing background information on individual documents or situating them within a larger archive. Students require this context to make the sources sufficiently accessible and enhance their critical thinking, since they often do not have the foundational knowledge required to situate the sources themselves. Online primary sources are even more susceptible to decontextualization, since keyword searching encourages the user to look for specific snippets of a document in which a given term is mentioned and then skip forward to the next, rather than reading the document in its entirety (Garrett, 2006). Also, search engines and collections of links to online sources can contribute to this problem by disaggregating individual documents from their archive of origin.

The final key observation arising from the interviews is that students and faculty tend to use a core set of convenient and familiar technologies, even though technology has the potential to more fully support the student learning experience. Participants related that they often rely on mainstream, user-friendly tools, such as presentation software, LMSs, and bibliographic management programs. While these technologies are familiar and save time, they do not necessarily contribute to the learning process. This point is illustrated by one faculty participant's observation that:

[s]tudents use technology to make their world small and accessible, so they can reach many places. At the same time, they're not developing those tools [to be] a source of intellectual engagement.

Technology can be used to facilitate educational creativity and innovation, but incorporating it into the classroom requires a large investment of time and effort, and the hoped-for pedagogical benefits might not be realized. For example, technology can fail in the middle of a classroom demonstration, be poorly matched to the intended learning experience, or be applied gratuitously without contributing to pedagogical objectives. Given this investment and the potential pitfalls, one faculty participant observed that the time and effort instructors devote to enriching the learning experience through technology is often not adequately acknowledged. Using unfamiliar educational technology demands students' time and effort as well.

Conclusion

The key themes described above suggest a variety of implications for how technology might successfully support teaching and learning with digital primary sources. Not surprisingly, the most important is that the technology should be easy for students and faculty to use and save their time, which is at a premium. The technology should also support learning objectives and create an educational experience that engages students with digital primary sources. Finally, the technology should provide opportunities to contextualize the sources with the objective of facilitating pedagogical goals and enhancing student learning. The authors are currently exploring potential functionalities for a digital educational tool that will directly address the user needs identified by this study. Two possible directions that meet multiple requirements are considered below.

The first idea, a semantic portal for primary sources, would save time and increase ease-of-use by increasing the findability and context of primary sources. This portal would require an ontology, a structure that enables linking of related concepts within and among documents and could, for instance, mitigate issues with historical language. Semantic technologies have great potential to increase the ease and granularity of searching for topics, events, people, and places, which helps to overcome the limitations of subject headings and imprecision of keyword searching. These technologies could also enable comparisons across space and time and allow richer contextualization of sources by exposing

complex, often nonlinear relationships and the organizational structure of collections. Taken together, these improvements would facilitate the identification of relevant documents. An interim approach to implementing a semantic portal would be to create advanced browsing categories to improve conceptual access to primary-source content, thus meeting some of the same goals on a more limited scale.

Another thought for the tool incorporates the participants' suggestion to develop simulations, which addresses the goals of student engagement and contextualization of sources while simultaneously supporting learning objectives. Although this idea requires more research, one direction for the simulation could take the form of a game in which students build their own virtual archive or library, from selecting period-appropriate clothing and furnishings to choosing digital resources to populate its drawers and shelves. Students would be required to consider the intellectual content of the sources to create a meaningful organization for their simulated archive or library, thus meeting learning objectives to think critically about and create context for the material. Such a simulation would excite students' sense of adventure and allow them to take ownership in the learning experience. It would also be firmly grounded in constructivist learning theory: "[simulations and games] are important because they let people participate in new worlds. They let players think, talk, and act – they let players inhabit – roles otherwise inaccessible to them (Schaffer et al., 2004, p. 4)."

The ideas for a tool described here are but two of many ways to incorporate functionalities that students and faculty themselves have identified as valuable to facilitating pedagogical goals and accommodating learning preferences. In addition to informing the development of a tool, this research suggests how users would like to work with online primary sources and how information technology can more effectively facilitate educational goals and student engagement in university-level humanities education.

Notes

This article will use the term faculty to refer to all faculty instructors, including adjuncts, instructors, untenured faculty (assistant professors) and tenured faculty (associate and full professors). The term student refers to both graduate and undergraduate students unless otherwise specified.

The Internet History Sourcebooks Project is available at: www.fordham.edu/halsall/

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Appendix 1: Student interview

1. Which, if any, of the following characteristics of neomillennial learning styles (Dede, 2005) do you recognize in yourself? Which, if any, of these characteristics would you say do not apply to you?
    a. Fluency in multiple media and in simulation-based virtual settings.
    b. Communal learning involving diverse, tacit, situated experience, with knowledge distributed across a community and a context, as well as within an individual.
    c. A balance among experiential learning, guided mentoring, and collective reflection.
    d. Expression through nonlinear, associational webs of representations rather than linear "stories" (for example, authoring a simulation and a web page to express understanding, rather than a paper).
    e. Co-design of learning experiences personalized to individual needs and preferences.
2. Describe the most interesting classroom experience or assignment you can remember in a humanities course. What made it interesting to you?
3. Describe an assignment you can remember in a humanities course that you think was unsuccessful. What do you think made it unsuccessful?
4. What digital educational tools do you use (e.g. for your coursework)? What characteristics of these tools do you find useful/not useful?
5. Think back to the last time you used a primary source in your coursework. What prompted you to use the primary source? How did you find and select it? How did you work with it?
6. What do you like best/least about working with primary sources?
7. In what ways have you worked with primary sources in the past? For each of the ways that you worked with primary sources, what did you like/not like about working with them?
8. What would you like to be able to do with primary sources that you cannot (easily) do now? What prevents you from doing this or makes it difficult for you to do this?
9. If you could design a tool for use with digital primary sources and you were unhampered by all practical constraints, what would that tool do/be?

Appendix 2: Faculty interview

1. Which, if any, of the following characteristics of neomillennial learning styles (Dede, 2005) do you recognize in your students? Which, if any, of these characteristics would you say do not apply to your students?
    a. Fluency in multiple media and in simulation-based virtual settings.
    b. Communal learning involving diverse, tacit, situated experience, with knowledge distributed across a community and a context, as well as within an individual.
    c. A balance among experiential learning, guided mentoring, and collective reflection.
    d. Expression through nonlinear, associational webs of representations rather than linear "stories" (for example, authoring a simulation and a web page to express understanding, rather than a paper).
    e. Co-design of learning experiences personalized to individual needs and preferences.
2. Describe an assignment you have given that you think was particularly successful with your students. What do you think made it successful?
3. Describe an assignment you have given that you think was unsuccessful with your students. What do you think made it unsuccessful?
4. What digital educational tools would/do you recommend to students in your courses and why? What digital educational tools have you observed that students like to use and why?
5. In your experience, what motivates students to engage with primary sources?
6. When you have given assignments to students in the past involving work with primary sources, what did you hope that they would learn?
7. What difficulties do students seem to encounter in working with primary sources?
8. What kind of guidance or intermediation is necessary (if at all) for students to reap the educational benefits of working with primary sources?
9. What would you like your students to be able to do with primary sources that they cannot (easily) do now? What do you think prevents them from doing this or makes it difficult for them to do this?
10. If you could design a tool for student use with digital primary sources and you were unhampered by all practical constraints, what would that tool do/be?