Fostering Historical Thinking With Digitized Primary Sources

Bill Tally
Lauren B. Goldenberg
Education Development Center
Center for Children & Technology

Abstract

This pilot study examined middle school and high school student performance on an online historical thinking assessment task. After their teachers received training in the use of digital historical archives, students from all groups engaged in historical thinking behaviors (e.g., observation, sourcing, inferencing, evidence, question-posing, and corroboration) in response to an open-ended document analysis exercise. The types of thinking they did are described, and differences between AP-level and non-AP students are discussed. Challenges teachers face in developing students' historical thinking around visual documents are also discussed. Educators seeking to take advantage of digitized primary source documents need activities with clear curriculum linkages and small exercises that give students guidance in working with different kinds of documents (visual, textual, and audio). In addition, students and teachers need far more practice in learning to make meaning from primary source documents—in beginning to think like historians. (Keywords: historical thinking, primary source documents, digital images, online learning)

INTRODUCTION

You know my method, Watson. It is founded upon the observation of trifles.
—Sherlock Holmes, *The Boscombe Valley Mystery*

A growing body of research suggests that educators face a key challenge with students across the curriculum: fostering active habits of mind in working with primary source materials (Bass, 2003; Bransford, Brown, & Cocking, 2000; Perkins, 2003; Seixas, 1998; Stearns, Seixas, & Wineburg, 2000). This research suggests that if primary source documents are going to significantly enhance students' understanding of content, students need to be both cognitively active and emotionally engaged when working with them. In particular, some of the things that students need to do are:

- closely observe the documents' features
- bring prior knowledge to bear
- speculate about causes and consequences
- make personal connections, and
- use evidence to support their speculations.

There is evidence that learners who develop and practice these habits with primary source materials perform better whether the domain is language arts, social studies, or science, and whether the grade level is upper elementary or high school (Brown, 2000). The reason is that these intellectual (and emotional)

habits with sources and data are at the heart of how critical thinking is defined in every area of the sciences and humanities, and now, in the information-rich workplace as well (Levy & Murnane, 2004). Indeed, the centrality of these skills is a key reason why digital archives of primary sources, such as those from the Library of Congress and elsewhere, have important roles to play in improving elementary, middle, and secondary teaching and learning across the curriculum.

The data we discuss here are derived from students' performance in an online document-analysis task. The task is part of our evaluation of a professional development program aimed at helping teachers use online primary source materials in their teaching.[1] It is also part of a larger inquiry into how students learn a particular discipline—history—using new technologies and primary sources, especially visual sources. Here we present the student performance data as suggestive of ways in which students can and do think historically with visual documents when given effective supports, including teacher guidance and software scaffolding.

It may be useful to briefly review some of the thinking and research that led us to hypothesize that well-designed software could support teachers and students in working closely with documentary sources, and thereby improve history teaching and learning. Our work has been shaped by three developments: recent cognitively-oriented scholarship in history learning, the growth of digitized history archives that put vast collections of searchable visual and textual documents at teachers' and students' fingertips, and our own professional development work with teachers that has underscored their relative lack of skill and confidence in interpreting visual sources.

First, the work of scholar Sam Wineburg and his colleagues has been extremely influential in helping educators and researchers understand how students learn well from documents and how teachers teach well with them. A cognitive psychologist who specializes in history teaching and learning, Wineburg has studied document-based learning among novices and experts, children and adults, students, teachers' and historians (Wilson & Wineburg, 2001; Wineburg, 1991, 2000, 2001). For example, Wilson and Wineburg (2001) found that successful history teachers construct activities in which students encounter documents for multiple purposes, such as noting point of view and bias and thinking about why different accounts vary, whereas less successful teachers construct activities in which students encounter documents for a much more narrow and restricted set of purposes, such as illustrating an idea or event, or finding the author's bias. For Wineburg, what is most important is giving children opportunities to explore primary and secondary sources in depth in order to figure out the "truth" of differing accounts. It is then that they are engaged both cognitively and emotionally, and it is then that their thinking—full of speculation and guessing based on what they can observe in the images and texts—most approaches that of expert historians (Wineburg, 2001). This kind of reasoned "messing around" with documents is also, he notes, precisely what we rarely allow students to do in history classrooms.

[1] An Adventure of the American Mind (AAM), a program of the Library of Congress, works in colleges of education and school districts in several states and regions to help K–12 teachers integrate primary sources from the online *American Memory* collections (memory.loc.gov) into their teaching.

Second, the growth of online archives of primary sources (such as those maintained by the Library of Congress, the National Archives, and countless universities, museums, and libraries) has made rich documentary materials widely available, and provided an extensive laboratory for teacher and curriculum development. These archives have formed the basis of much curriculum development and professional development during the past decade, from the Library of Congress' *American Memory Fellows Program*, to the National Archives' *Digital Classroom*, the National Endowment for the Humanities' *Edsitement*, George Mason University's *History Matters* teaching resources, and countless Web sites and institutes hosted for teachers by other cultural and academic organizations.

Several things are clear from these projects and the growing literature about them (Bass & Eynon, 1998; Tally, 1996). First, using primary documents gives students a sense of the reality and complexity of the past; the archives thus represent an opportunity to go beyond the sterile, seamless quality of most textbook presentations to engage with real people and authentic problems. Second, the fragmentary, idiosyncratic, and often contradictory nature of primary documents can help students understand the problematic nature of historical evidence and the need for critical thinking about sources and bias. Third, the multimedia nature of most digital archives—the way they combine textual, audio and image formats—offers students with diverse learning styles multiple pathways into thinking about historical and cultural problems. Finally, the search engines that accompany most digital archives—for example, full-text searches on oral history archives or subject-based searching on photographic archives—enable students to query materials in novel ways that only experts have been able to do before now. Together, these capacities enable what Bass (2003) calls "the novice in the archive," the ability of students to work in ways similar to practitioners in the field, yet as novices rather than experts. "These kinds of activities—searching, examining patterns, discovering connections among artifacts—are all germane to the authentic thinking processes of historians and scholars of society and culture" (Bass & Rosenzweig, 1999, p. 6). The promise of digital image archives is that they can make it possible for students and teachers to engage directly and routinely in these more *authentic historical thinking* processes en route to acquiring a narrative grasp of history.

Historical images, in particular, are a useful point of entry for many students, for unlike historical texts—which often present archaic language that children must decode before they can begin to construct meaning—photos, lithographs, cartoons and maps present instantly recognizable features and information, and easily evoke background knowledge that children can begin using in building an interpretation. In our own work with history teachers and students around these digital archives, we have seen their promise as well as the challenges teachers face in using them. To cite just two examples of digital historical image use as part of more active and rigorous history classrooms, seventh graders in several Virginia classrooms we worked with created period "newspaper" articles to accompany photos they selected and carefully researched from the Library of Congress collection of *Selected Civil War Photos* (Ridgway & Donelly, 1998–1999). And in an eleventh grade Michigan classroom, students compared and connected portraits of Depression-era life in John Steinbeck's novel *Grapes*

of Wrath with those in interviews conducted by WPA writers and pictures taken by Farm Security Administration photographers (Federspiel, 1998–1999).

Yet teachers as well as students face challenges in using visual historical sources well. For many teachers, it is common to use historical images simply as *illustrations* of established fact, rather than as data from which to reason about the past. (This is understandable: it is exactly how most history textbooks use imagery.) What gets overlooked in such cases is the often contradictory information images contain, the purposes they might have served for their creator, and the understandings that viewers might have brought to them.

Based on the insights gained from working with historians and skilled history teachers, we created a set of inquiry tools and templates whose purpose is twofold: (1) to support and scaffold image-based history learning in the online environment; and (2) to make visible and comparable the thinking processes of students, teachers and historians as they interpret documents—both for teaching purposes, and for research. The software inquiry tools can be found on a Web site titled *Picturing Modern America* (http://www.edc.org/CCT/PMA/), which helps students and teachers explore historical documents related to the building of modern America from 1880–1920. The word "picturing" refers both to the prevalence of mass-produced imagery (lithographs, photographs, films, panoramas, etc) that were characteristic of the period (and that enable students to learn about it), and also to students' active historical imagination.

Although research into student thinking with documents and images is growing, thus far we know of no studies that have examined students' historical thinking behavior with software tools designed to support them. It is this issue that we explore in the current pilot study.

RESEARCH QUESTIONS

Our research questions in this pilot study were:

1. How do students describe their current history or social studies class (given that it was taught by a teacher trained to use primary documents)? Sub-questions include: Do they see it as different from prior history/social studies classes? And, do students, according to their self-reports, learn more history, and like history more, as a result of their current class?
2. What historical thinking skills do these students exhibit?

METHODS

Drawing from parts of the *Picturing Modern America* Web site, we constructed an online historical interpretation task for middle and high school students to complete. The task asked students to look closely a historical image from the *American Memory* Web site, take notes on details they observed, and draw conclusions based on their observations and prior knowledge. Students could choose one of three images from the turn of the 20th century: a photograph, a panoramic map, or a political cartoon. The online assessment task led students step-by-step through the reading of a primary document they had not previously seen. The task served as a scaffold upon which students might—or might

not—display historical thinking behaviors. Students were asked to assume the role of "history detectives." First, they were asked to select a question to answer about the image, or invited to write their own question. Then, by clicking on the image, they were able to "gather clues" about the details they noticed in the image. Finally, they were asked to draw conclusions based on their observations (responses to the "clues") of the image. Students also completed a brief questionnaire that asked them about their experiences in their history classes compared to previous classes. These data—the questions students posed, the descriptive details they noted in the clues, the conclusions they drew, and their responses to the questionnaire—were captured by our servers. (See Appendix for sample screens from the task and the questionnaire items.)

We contacted teachers who had participated in a professional development program whose aim was to encourage the use of Library of Congress's *American Memory* collections in K–12 classrooms. Using data from a survey of 358 of these teachers, and information provided by professional development staff, we sought teachers that met several criteria: they needed to be teachers of the humanities (i.e. history, social studies, or language arts), they needed to be at the middle or high school level, they needed to have worked with students around primary sources to some extent during the past year, and if possible they needed to teach humanities courses for remedial as well as advanced students.[2]

Based on these criteria, we invited seven middle and high school teachers from public and private schools to participate; five were able to schedule their students to complete the task in the time frame allotted. Teachers received instructions for administering the task to their students, including a standard introduction to be read before students began the task, telling the students the purpose of the task, what would happen to the data collected, that the activity was not going to be graded, and that there were no right or wrong answers. Students completed the task within one class period. Most teachers had their students complete the task in a computer lab setting, with each student working alone at a workstation.

Because the professional development program in which the teachers participated was focused on the use of primary sources and new technologies for learning, we reasoned that in history classrooms where the teachers used these strategies a great deal, students would likely perform better on such a task than students in classrooms where teachers did not use these strategies a great deal. Accordingly, we sought to recruit middle and high school history teachers who were ranked "high" and "low" in the use of primary sources and new technologies with students, by virtue of their responses to a teacher survey administered to participants in the professional development program. In the time allotted, however, we were only able to recruit teachers whose use of primary sources and new technologies was relatively high, making the high/low comparison moot. However, the five classrooms varied in other, interesting ways. Subject matter taught was one: three were history classes, one an English class, and one a geography class. Another was grade level: two were

[2] The full evaluation report in which these data were originally presented, dated April 2004, is available online at http://www.aamprogram.org/curriculum/reports_independentAssessment2003.aspx.

middle school classrooms and three were high school classrooms. Finally, classrooms represented contrasting academic ability levels: one was an AP/Honors class, three were regular history or English classes, and one was a history class attended by low-achieving students. Thus, the student task became a pilot assessment of students' historical thinking, as revealed through the software, across all these variations.

A total of 159 middle and high school students from four different schools completed the online activity. The respondents came from six classrooms in four schools. (See Table 1.) The students represent a mix of genders (53% were female, 47% male), grade levels (47% were in grades 6–8 and 53% in grades 9–12), and academic ability levels (80% were in regular history classes or non-AP social studies classes, and 20% were in honors or AP history classes).

The data consisted of students' responses to the activity and questionnaire, as described above. Data were compiled in a spreadsheet and analyzed for trends related to each group's context. Categories of analysis were derived from the work of Wineburg (2001), Seixas (1998), and others (e.g., Stearns et al., 2000) on how people develop as historical thinkers. This research has found that historians approach the reading of documentary sources differently from novices, regardless of whether the novices are children or adults. Novices tend not to engage in the following kinds of behavior that constitute reflexive "habits of mind" for experts in the humanities:

- ***Observation***: Scanning and parsing the document, observing details
- ***Sourcing***: Considering who made the document and what their motives are
- ***Inferencing***: Making inferences, speculating, guessing about meaning
- ***Evidence***: Citing evidence when making inferences or drawing conclusions
- ***Question posing***: Cultivating puzzlement, keeping track of one's questions
- ***Corroboration***: Comparing what is found to what one already knows, other documents, etc. (Stearns et al., 2000)

Table 1: School and participant overview

	Grade Level	Type of Class*	No. of Students
School A			
Public high school, urban area	11	AP/Honors	23
	11/12	"Remedial"	36
School B			
Public middle school, urban area	6	Heterogeneous	26
School C			
Public middle school, rural area	7	Heterogeneous	21
	8	Heterogeneous	26
School D			
K-12 religious school, rural area	10,11,12	Heterogeneous	24
TOTAL			156**

** Some students in heterogeneous classes indicated that they were AP or Honors students.*

*** 159 students completed the exercise, but some students provided incomplete demographic data.*

Thirty-two students chose the political cartoon, 33 chose the panoramic map, and 94 chose the photograph.

RESULTS

Question 1: How do students describe their current history or social studies class? Do they see it as different from prior history/social studies classes? Do students learn more history, and like history more, as a result of their current class?

More than two-thirds of students (68%) said that their current class (taught by a teacher trained to use primary sources) was different than previous history classes they had taken. Students consistently cited three things that made their current class different: (a) using technologies to learn in new ways, (b) working with primary sources to gain deeper understanding of history, and (c) learning independently as well as in small groups. Students said that in one way or another all three of these practices are important to them because of how they differ from typical history class, which they characterize as over-reliant on a single textbook, lecture-driven, and providing few opportunities to discuss or debate ideas. One more distinguishing trait of these classrooms: lots of work. Students consistently reported that they have more work in their current history classroom than in prior classes—but as the next section indicates, they still like it more.

Following are characteristic student statements about what made their current history or social studies classroom different from previous classrooms.

Using new technologies to learn differently

The greatest percentage of students (nearly half) said that their current class is different because of the roles that technologies play. Significantly, however, they did not just say they liked using computers in their classes, but they also connected their use of computers to more active, interesting assignments, resources and activities.

> We use the computers a lot more than we ever did in my other history classes. Our assignments are always more interesting when we use the computers, and I'm learning how to research things more efficiently.[3]
>
> –11th grade female, School A

> This year, we were assigned to pick a particular American Memory collection to study and build a project from. I chose the Wright Brothers Collection, which I found very interesting. I built a 4ft replica of the first plane, which was a very different project, which I greatly enjoyed.
>
> –11th grade male, School D

[3] Student writing excerpts are produced verbatim, with idiosyncratic capitalization and punctuation as well as spelling errors intact. It is interesting to note that the middle school students relied heavily on the written vernacular common in online interactions such as instant messaging.

We are using computers and getting information that you just can't get from the books. We are learning valuable things through pictures, and understanding what has gone on in the past.

–11th grade male, School A

It is differnt b/c i have never done anything on a computer and it is more interesting.

–7th grade male, School C

I was used to always using the textbook and movies. Now we have computers and we can participate more. Better assignments.

–12th grade female, School A

It is cool to have a lap top computer so it makes learning more hands on exspeshly with the projecter.

–8th grade male, School C

Using primary sources for a deeper understanding of history

About a quarter of students said that their current class feels different because it involved materials besides the textbook. Many cited primary sources as an important element, using terms such as "in-depth," "seeing things for myself firsthand,"' and learning "the whole picture" of history.

We have more in depth topics and projects and discussions. We use more primary resources, which I haven't used much before in my other history classes.

–11th grade female, School A

We not only use our textbooks, but also use many resources to expound on what we are learning. For example, if we are learning about a specific President we integrate other information from AAM to enhance what we are learning not only about his Presidency, but also things about his every day lifestyle.

–6th grade female, School D

It helpz me learn more bc i see pictures and it is different bc textbooks r boring and i dont think u learn that good bc u dont pay attention but with the computer and showing pictures i know i have learn a lot.

–8th grade female, School C

> Seeing the primary source documents has helped me be more interested in history. Also, when we just read textbooks, we did not learn the whole picture of history. History books do not always tell what happened the way we have been able to learn it.
>
> –6th grade female, School D

More independent and group work

About a fifth of students say they spend their time in their current classes differently than in prior history classes. They say they are doing more independent and group work, and less lecture and seatwork.

> In the other history classes I have taken, most of the time I am reading out of a book or listening to a teacher talk.
>
> –11th grade male, School A

> In the past years I have just read about this stuff and this year I got to make things and do projects and I actually got to have a war (with paper bullets and bombs of course.
>
> –8th grade male, School B

> We tend to do a lot more group work and projects. It isn't so much reading out of the book.
>
> –11th grade female, School A

> It's more interesting in this class... We do more by ourselves and I like that better than last year, when the teacher always just stood up in front of the class and talked.
>
> –12th grade female, School A

Learning—and liking?—history

Nearly nine out of 10 students in these five classrooms (87%) said they had learned more history in their current class compared to prior years. And almost three-quarters of the students (72%) said they now liked history more as a result.

These are remarkably robust numbers. Before looking at the details, it is worth asking:

How much can we trust these kinds of positive self-reports, coming from two thirds of student respondents? How likely is it that some students felt inclined to write more positively than they felt, for example, imagining it might reflect well on them or their teacher? This is possible and even likely in some instances. However, if students were being generally honest we would expect at least a few in each group to report no difference in their classroom, and no greater learning or liking of history as a result. The reason is individual differences: students who truly dislike history or have had negative experiences with it in the past should not report a positive change due to one classroom experience. And this is the

case; in each classroom, between 10% and 25% of students said that their history classrooms were still uninteresting to them. Far from casting doubt on the largely positive findings reported, these kinds of responses confirm that students felt free to answer honestly—i.e., that the task did not skew it too heavily in the positive direction. Here is a sample of these comments:

> Last year was the same as this year. We both were reading out of a book. And just talking about what we read.
>
> –6th grade female, School C

> I am not liking history any more than in the previous classes. I am not a big fan of studying history, because I believe that the past is the past, and we should leave it there.
>
> –12th grade male, School A

> I hate having to learn everything straight from the book.
>
> –11th grade male, School A

> History is pretty much the same way as before. It's just not interesting to me.
>
> –8th grade male, School C

> I don't like history class because its based on nothing but memorizing the material. I like a class more like math where you memorize the method or methods and then apply yourself and your own knowledge.
>
> –12th grade female, School A

> I am learning a little more about history but I don't like history any more than I used to.
>
> –11th grade female, School D

What do students learn, and like, in their history classes? Two interconnected themes emerge from the examples students provided. First, they described having a sense of competence because they had mastered a body of knowledge in greater detail than usual. It is possible that the newly-trained teachers are asking their students to do "more with less"—to slow down and spend time working closely with a few documents from one event or time period, rather than moving through a lot of material in an effort to "cover it." This "depth over breadth" approach goes against the typical grain of history teaching, and appears to have real benefits for students. In their comments, students explicitly cited greater understanding and list many specific areas of knowledge they have studied and mastered.

I understand more [this year], and it feels good.
–8th grade female, School C

In the past I may have been too young or not listening all the time because now since in the 7th grade I understand history and like it much more. I used to think it was boring but now I am beginning to think it's not.
–7th grade female, School C

I have learned more about the settlement of Virginia in the 15 and 1600s. I have liked learning more about the founding of our country.
–11th grade male, School D

It was hard at first but now it is not. i have learned a lot about the children that was Jewish and was killed at camps bc of germans.
–8th grade male, School C

Second, students, especially those in the older grades, said they enjoyed learning to work with different media and materials, including primary source materials and *American Memory*. They say that the online primary documents offer greater ease of doing research, a more vivid understanding of the past, and more opportunities to think for themselves.

I think it is easier to learn and remember when you can see the original papers, pictures and documents. American Memory has divided things into collections, which makes it easier to find a specific thing when you are doing a research.
–12th grade female, School A, Honors

In history class this year, I learned more about Western expansion and the hardships of it through the American Memory Collection "Utah and Western Migration."
–11th grade female, School D

I like when we have done research on a specific topic, created a powerpoint presentation, and built an exhibition piece about what we are leaning.
–11th grade male, School D

Question 2: What historical thinking skills do these students exhibit?

At the heart of our inquiry was finding out what historical thinking skills the students exhibited. Our question was: Did these students engage in historical thinking behaviors (e.g., observation, sources, inferencing, evidence, question posing, and corroboration) when confronted with a primary document they

had not seen before? The short answer from this pilot study of five classrooms is yes, and to a surprising degree, they did so across all groups.

As might be expected, high school students in AP and honors classes exhibited these behaviors to the greatest degree. These advanced classes are usually the only places where students are exposed to primary source-based research, and critical thinking about documents. What is significant is that students who were in regular and even history classrooms labeled "remedial," and students of middle-school age displayed aspects of good historical thinking as well. Their responses often contained less background knowledge of the period and less sophisticated language than the advanced students. Nevertheless, they approached documents actively, noting details, drawing inferences, and using evidence.

Below we describe the kinds of historical thinking students displayed in response to the digital images. Although students displayed multiple types of thinking in response to all three images, for reasons of space we present responses to two of the documents—the photograph, which elicited a wide variety of *observations* and *inferences*; and the panoramic map, which elicited examples of *sourcing* and *corroboration*.

Historical Skills: Observation and Drawing Inferences

Figure 1 reproduces the photograph. It is of a street scene from the Detroit Publishing Co. collection titled "The Close of a Career in New York" (Library of Congress, 2005). By clicking on the picture, students "gathered clues" about it (details were highlighted onscreen, and a "notebook" appeared for students to write down what they saw). Some details that students could select for comment are also pictured.

Here are some of the observations that high school AP/Honors students made about selected portions of the document. Even in simply recording what they saw, these students carefully noted details, posed questions, and made inferences from the visual information before them.

> There are little kids sitting on the side of the road near a dead horse, they have their feet in what looks like drain water. None of them seem to be well dressed. [noting detail]

> Water means it rained or the road has poor drainage. Great place for bacteria to grow. [inference]

> The road has water puddles in it so it has been raining. Also, the road having puddles means it's uneven or cracked. [inference; noting detail]

> There are cars up ahead, looks like the very first model T's. [corroboration]

> There are cars, so what is a horse doing on the road? [cultivating puzzlement]

You see the big difference between the business-looking environment of the background and the dead horse laying in the road in the foreground. I think someone made this to show the gap between the rich and poor during the 1900's. [sourcing]

The buildings up the street seem to be more well kept. Are the people richer in that direction? [inference; question-posing]

If we compare the observations above to those of regular and remedial history students at the high school level, we see less background knowledge overall and often less grammatical writing present. However, we also see evidence of parallel historical thinking processes:

The horse is dead in the street. Maybe there was a riot, or maybe there is a lack of food. [inference]

Document

Details

Figure 1. Document 1—Photograph from the **American Memory Collections**

Is this a dead cow? Isn't that something a child should not play near? [inference]

A Dead Horse. There isn't lot of money to feed the horse, or take care of it. It's very unsanitary conditions. [inference]

Puddle. Maybe the horse stumbled in the pothole and broke its ankle and the owner left it there to die. [inference]

A bunch of scary children. They don't seem to mind the horse being there. Maybe they dont know any better. [noting detail; inference]

People and carriages. Don't seem worried that the horse is dead and the kids are playing near it. [inference]

Middle school students, too, actively read the document and exhibited good strategies of historical thinking as they encountered it, particularly in noting detail and drawing simple inferences. But at their age, they do not scan the document as completely nor do they bring as much background knowledge of the period to bear:

Looks like they're sittin there hungry and they're pointing to the camera. [inference, noting detail]

I see six Childern sitting and one standing up.I think that the kids are talking about the died horse. [noting details; speculation]

the children are living on the street probably with no shelter and they probably don't get to eat a lot. [inference]

i see a dead horse and a little boy, and he has a stick in his hand that has a sharpe porint on the end. did they kill the horse? [noting detail; speculation]

Historical Skills: Corroboration and Citing Evidence

Corroboration entails comparing what one finds in a new document to what one already knows, from other documents, from experience, or from prior study of the period. Using evidence means pointing out the reasons for one's inferences and conclusions, and grounding them in the document. Here again, comparing the performance of high school AP/Honors students to the less academically oriented as well as the younger students suggests that students at all levels displayed good historical thinking skills.

For example, students displayed their skills at corroboration and using evidence when they drew conclusions about the following Panoramic Map of Seymour, CT in 1879 (Figure 2) (Library of Congress, 2005).

When a high school AP/Honors student drew a conclusion about what most people in Seymour did for a living, she synthesized her observations of the map:

> I think most people in Seymour, Ct. make their living in 1879 by working in the mills and factories located close to the river.

And she then went on to cite corroborating knowledge from her prior studies about industrial America, and evidence she found in the picture:

> From the picture, it looks as if there were large factories close to the river, in which the mills could generate power from the river. It also

Document

Details

***Figure 2. Document 2—Map of Seymour, CT from* American Memory Collections**

looked as if there were houses close to the factory possibly of those who worked at the factory. [corroboration; evidence]

In comparison, when an 8th grade student reached for a conclusion about what people in Seymour did for a living, she said:

They had to work in mills all their lives, and other factories.

She also drew on what she knew for corroboration, but it was far more immediate knowledge:

My uncle worked in a factory, like the one they got in the picture. With smoke all coming out. And that is why I think that.

CONCLUSIONS AND IMPLICATIONS

What does our investigation into how students "read" digital images reveal about historical thinking and how it may be fostered? Our findings underscore several things.

First, it appears that students can apply historical thinking behaviors to primary sources even without prior direct teaching about the historical era or context. In this case, students approached images about turn of the 20th century American life simply as "historical detectives," apart from any curricular unit they were studying. This may indicate that students have learned skills of document analysis (from teachers who themselves were trained in these skills) that are *transportable* across historical topics. Alternately, this may signify that the supports built into the software tool to scaffold historical thinking may have worked. A deeper, rigorous investigation into what helps students exhibit historical thinking behaviors is needed.

Second, students' comments about their resource-rich history classrooms echo what we have long known about "hands-on" learning in other parts of the curriculum, notably science and mathematics: When students have structured opportunities to construct meaning from primary materials, and critically examine those meanings, they feel more invested in the results. This suggests that as artifacts in multiple media enter into the history classroom we may see shifts in learning and motivation associated with the rise of "hands-on" learning in science and math (Anderman & Midgley, 1997; Bransford et al., 2000; Lumsden, 1994; National Research Council, 2000).

In sum, this pilot investigation of student performance on a digital image analysis task indicates that in classrooms where teachers are using primary sources to actively engage students, students are learning important skills of historical interpretation and document analysis. Scaffolded exercises of this sort described here, coupled with classroom instruction, help students integrate acquisition of historical content knowledge and development of historical thinking skills and immerse students and teachers in building knowledge from documents, in ways that reflect disciplinary perspectives.

This study contributes to a growing body of literature on the skills that teach-

ers and students need to "read" and make meaning from a wide variety of source materials, whether photographs, maps, quilts, music, speeches, or cartoons (Bass, 2003; Seixas, 1998; Wineburg, 2001). These skills include things such as close observation and document parsing, sourcing (asking about the maker and his/her motivations), inferencing (making guesses, speculating, posing questions), and corroboration (comparing what you find to what you know from other sources) (Wineburg, 2001).

We offer several conclusions that might help educators and researchers foster historical thinking in middle and high school students using digitized visual images.

Professional development programs in history and the humanities need to build teachers' skills in analyzing documents and images, as well as improving teachers' content knowledge of history. Second, software programs that scaffold image analysis can be useful tools for teachers. By "slowing down" the process of image analysis and sequencing it through stages of observation, information gathering, making inferences and posing questions, they can help make student thinking visible—to students themselves, to teachers, and to researchers.

The next stage of software tool development includes enabling learners to go beyond their individual interpretations of documents. This next generation of scaffolds and supports should enable students and teachers to compare their own novice interpretations to those of other novices as well as expert historians, and learn from them; and enable students to "curate" and publish on Web sites their own historical exhibitions, and to engage in conversations with other students and teachers using Web-based forums about the meaning of their work. Making student work public in new media formats will create opportunities for review by broader professional and public audiences.

A question remains about whether students, when analyzing documents, are practicing true historical thinking behaviors (i.e., habits of mind that help them sympathetically yet critically imagine the world of the past), or simply repeating a heuristic routine in a formulaic way. This is an issue we plan to explore in future work. Fostering the historical thinking behaviors we have documented here is just one small piece of the larger challenge that history teachers face—helping students develop the sympathetic yet critical imagination that characterizes historical inquiry as practiced by professional historians.

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Contributors

Bill Tally is a senior researcher at the Education Development Center's Center for Children and Technology. He has worked in the area of digital archives and history teaching and learning for more than a decade, developing software and teacher development programs in addition to conducting research. His research

interests include media literacy and the digital divide, and he is the author, with Cornelia Brunner, of *The New Media Literacy Handbook* (Knopf, 1999). Lauren B. Goldenberg, PhD, is a researcher at EDC's Center for Children and Technology. Her research interests include the role of technology in teacher learning, and its role in learning second and foreign languages. (Address: Bill Tally, EDC Center for Children & Technology, 96 Morton Street, 7th floor, New York, NY 10014; btally@edc.org.)

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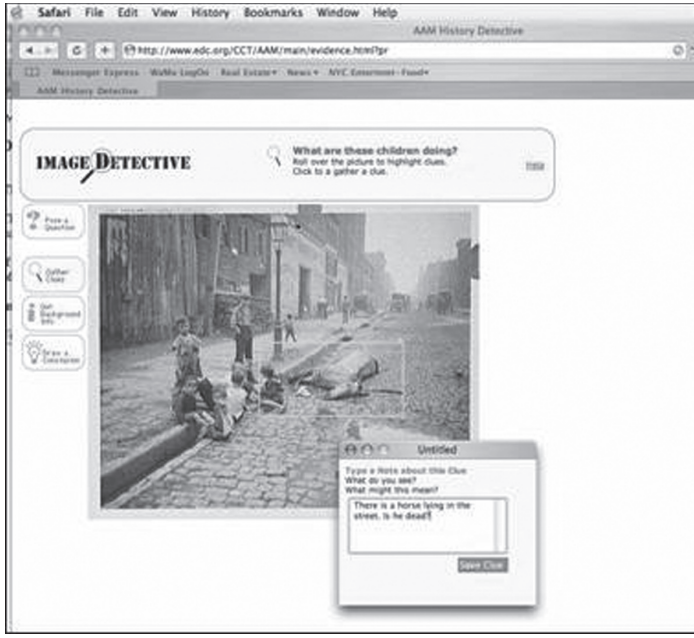
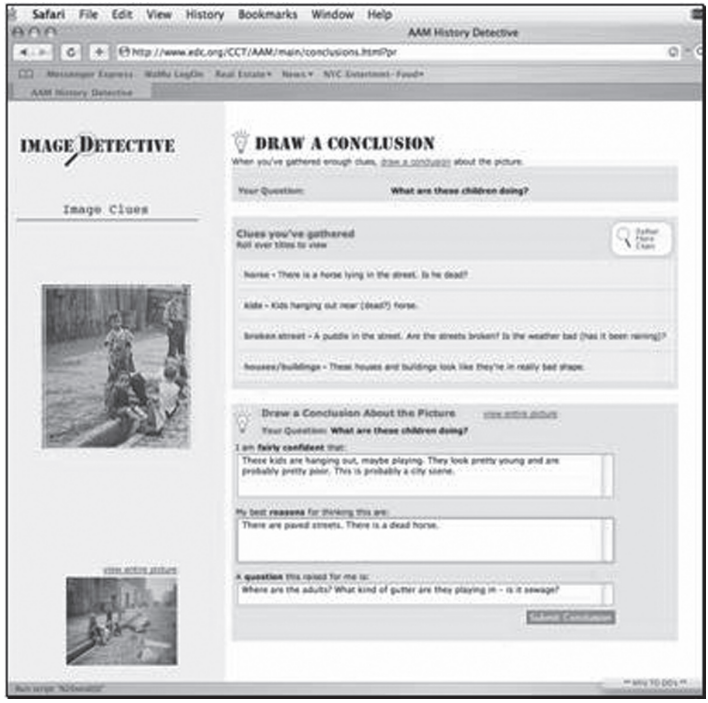
APPENDIX:

Student Activity: Sample Screens and Student Questionnaire





1. Is the way you are learning history THIS year different from how you have learned it before, in other classes? o yes o no

If yes, how is it different? (Please be as specific as you can. For example, you might say how the *topics*, or the *assignments*, or the *materials*, or the *activities* you do are different.)

2. Does the way you are learning history this year work for YOU?
Are you learning more history? o yes o no
Do you like history more? o yes o no

If yes, please tell us an *example* of something you have learned, or something you have liked in your history class.